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ON

CURVATURE OF THE SPINE,

AND

DISEASES OF THE VERTEBRAL COLUMN.

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THE CAUSE AND TREATMENT

OF

CURVATURE OF THE SPINE,

AND

DISEASES OF THE VERTEBRAL COLUMN.

Illustrated with Cases and Plates.

BY

E. W. TUSON, F.R.S. F.L.S.

SURGEON TO THE MIDDLESEX HOSPITAL, AND LECTURER ON ANATOMY AND PHYSIOLOGY AT THAT HOSPITAL.

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TO

HIS GRACE THE DUKE OF DORSET, K.G.

&c. &c.

My Lord Duke,

It is the almost exclusive privilege of England to boast, that any effort for the alleviation of suffering humanity ever finds a firm and ready support from her high aristocracy.

In accepting the Dedication of a Work exclusively devoted to this purpose, Your Grace has conferred an honour on it that I can hardly flatter myself it merits.

I have the honour to remain,

My Lord Duke,

Your Grace's obedient and humble Servant,

E. W. TUSON.

No. 10, Russell Place,
Fitzroy Square.

PREFACE.

AMONGST the various sciences that in this enlightened age are making rapid progress, there is not one which, whilst it outsteps the others in advancement, is still so subject to error and false reasoning as the medical art. This is owing to theories being advanced, and from them plans of treatment pursued, the fallacy of which can only be detected by time and experience. Were this mode of practice confined to those cases having no fixed point from which a true and palpable diagnosis could be formed of the predisposing cause to disease, some apology might be urged for its

adoption; but unfortunately it extends to those where outward indices, and other tangible proofs, leave no doubt as to the true nature of the disordered state in the organic structure.

It is singular that where mechanical contrivances are required, as forming a prime and essential agent in the cure of a *disease*, theories are constantly acted upon, instead of the *practical results of mature deliberation*, and yet how evident it must appear that it should be the very reverse. For PRACTICE, founded upon observation, only acquires additional weight by the slow and tardy progress of investigation, and comparative proof; whilst THEORY at once dashes on, overthrowing all barriers, and overcoming at one bound all difficulties; sometimes catching the truth, but more often only obtaining a glimpse of it, through a dense mass of error: and not unfrequently committing irreparable mischief, before *that* error is acknowledged.

The injurious effects of such a system in the treatment of a disease, however unimportant, are too

evident to require comment. What then must be the result when applied to the treatment of the Diseases and Deformities of the Spinal Column?

It is only of late years that scientific men—from some strange hallucination—have turned their attention to this disease; but all the treatises hitherto published—however excellent they may be when applied to specific cases—appear to me to partake more or less of theoretical reasoning. A disease presenting itself under so many different features, with the same characteristics, must require a specific treatment, adapted to each form it assumes: a mechanical contrivance, therefore, that would act with advantage in curing a deformity offering certain peculiarities, would have a diametrically opposite effect when it showed itself with other combinations. Hence it follows that *any one plan of treatment for all cases indiscriminately* must be fallacious. This palpable error struck me most forcibly on my first commencing my professional career, and time and observation have contributed to con-

firm it. I felt there was a large field for investigation,—a wide chasm that might be advantageously filled up: I therefore directed my most assiduous attention to the subject, and am now able to lay before the public the results of my observations. The success I have experienced, not only in my public practice at the hospital, but also in my private circle of patients, induces me to anticipate that they will prove beneficial, and that I shall not have laboured uselessly.

In compiling the following pages, my attention has not been solely confined to the Diseases of the Spine: I have also endeavoured to expose in their proper light certain errors and pernicious habits, practised and followed in the physical education of the female part of the community, which in a great measure lay the foundation for this disease.

In attempting this latter part of my treatise, I am aware of the difficulties that surround me: I have to grapple with long-standing prejudices,—with customs that have the sanction of years for

their continuance, and with—what is worse than all, *fashion*, that bane to common sense and reason. These considerations—cogent as they may appear to the casual observer, unimpeachable as they may seem to those who have not by sad experience felt the reverse,—can weigh but little with the anatomist in his physiological researches. With him—as with the astronomer—the laws of nature are fixed and immutable; and he raises his voice against whatever may tend to derange and pervert their natural order or fundamental principle. Before him nature stands unveiled; he investigates with a peering eye that incomprehensible structure, the human frame; he explores the deep and secret recesses of its hidden mechanism; he knows that in the organization of animal life there are certain fixed laws, which, in whatever species they may be found, are invariably the same, having the same nature and sympathies, the same vital and physical principles, emanating from the same cause, and destined for the same functions.

Can it then be a matter of surprise that he should pause, when, in pursuing his minute inquiries, he finds that magnificent work of a Divine hand perverted, and distorted from its original perfect and beautiful symmetry,—stunted in its growth,—curtailed of its fair proportions, to please the vicious and monstrous taste of modern manners?—for such, whatever may be said to the contrary, are the results of the present fashionable style of dress. I would most seriously recommend the careful perusal of this part of my treatise, not only to the parent, but to the medical practitioner, who I trust will find the anatomical elucidations of sufficient force to bear out my assertions.

My professed object in publishing the present volume being to offer a practical treatise on the affections of the spine, it will be found that I have devoted considerable space to those diseases that are of daily occurrence, and therefore more subject to improper treatment.

The plates that illustrate this treatise will, I

trust, prove of considerable assistance, and justify my expectation, that the work will be the means of re-establishing the health of many sufferers labouring under this disease.

Russell Place,
December, 1840.

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ON

AFFECTIONS AND DISEASES

OF THE

VERTEBRAL COLUMN.

INTRODUCTORY REMARKS.

THE spinal column may be considered as one of the most important parts of the human body. It is placed in the centre of the back, and contains the spinal marrow—a part most essential to life—in such security, that be the position of the body what it may, not the least pressure can be made against it: it allows the nerves, which give both motion and sensation, to run to the most distant parts of the frame, protecting them from injury as they pass out: it supports the whole body, giving attachment to the numerous muscles, and also power to the trunk to assume a variety of motions: it is capable of being moved either forwards or backwards, and to either side, according to the will. When we walk, the spinal column assists in supporting the leg which is advancing, by means of the muscles attached to it: it supports in like manner the

arms, and the head moreover rests upon it. Thus it is the medium of connexion between the head, the extremities, and all the parts of the frame; and we must therefore view it as one of the most important parts of the animal economy.

The anatomical formation, structure, and general union of the several parts composing this essential portion of the body deserve our deepest consideration; for is it possible by the exercise of skill, however great, to repair any mechanical contrivance, without clearly understanding its primary formation and principle? At the same time we presume not to compare the structure of any part of the body with the mechanical inventions of man, inasmuch as the least important part of the human frame very far exceeds, in design and conception, the brightest efforts of human wisdom. The knowledge of the structure and formation of the spine must, then, necessarily precede a knowledge of the affections and diseases of the vertebral column; for no one can comprehend and treat successfully any complaint or disease, unless he is well acquainted with the structure, formation, and functions of the organ affected. A description, therefore, of the manner in which the spine is first formed, the way in which it increases, the means

by which its several parts are connected, and the offices that it performs, are points which deserve our strictest investigation; and when we examine the minute anatomical structure of this part of the body, we shall not be astonished to find it subject to a variety of affections, and be liable to disease. Before, however, entering into their detail, the reader's attention will be directed to the anatomy of the spinal column, from as early a period of nature as we are able to observe it, up to the time of its complete growth and fullest development.

ANATOMICAL OBSERVATIONS ON THE SPINE.

THE spinal column is an irregular bony canal, extending from the head to the lower part of the trunk, composed of several bones, so arranged, as to allow a free and perfect motion in every direction. In form it resembles two irregular cones, united to each other by their base; the apex of the upper one ascending towards the head, while that of the lower is directed downwards. The upper cone is composed of twenty-four bones, each called a vertebra: these bones have several processes arising from them, to give attachment to the surrounding muscles, and they form what is called the true spine, whilst the lower cone, consisting of the sacrum and os coccygis, is termed the false spine.

The twenty-four bones of the true spine are divided into those proper to the neck, back, and

loins: those of the neck, the Cervical vertebræ, are seven; those of the back, the Dorsal, are twelve; and those of the loins, the Lumbar, are five in number. The first bone of the neck is called the Atlas, on account of its supporting the head; the second is called the Dentata; the other bones are not named, but are distinguished as the first, second, third, Dorsal, Lumbar, or Cervical.

Each vertebra in the fœtus, at the ordinary time of birth, is composed of three distinct bony pieces, connected by cartilage, which ultimately becomes ossified. The anterior piece forms the body of each bone; the other two form the posterior and lateral parts, which unite behind to form the spinous process. This process in the fœtus is completely wanting: on each side of the body the transverse processes are situated, whose formation commences in the fœtus, and above and below, on either side, the articulating surfaces are speedily formed, to allow the one bone to move more freely upon the other.

At an early period of uterine gestation, the three pieces which ultimately form a single bone are merely cartilaginous substances; the first sign of their becoming bone being the appearance of an artery passing towards their centre, where a small ossific

body is deposited in the middle of each separate part. From this point the bony deposit increases, until the sides and body gradually unite, and the three portions become one single bone. The piece that forms the body of the bone begins to ossify at the centre; the two lateral pieces may have two or three points of ossification, which at birth will form but one piece.

The following plate will illustrate these remarks.

Plate I. A representation of the Spine of a Fœtus at a period before birth, when the ossification has commenced. Here the spinal column is almost in a cartilaginous state: a bony nucleus may be observed in the three distinct places in each of the bones of the spine—at the centre of the body of the vertebra, and at the posterior part at the two lateral portions or halves, which pass obliquely to unite to the side of the body of the bone, and which behind gradually advance towards each other to unite at the situation subsequently occupied by the spinous process. The transverse processes are completely cartilaginous. The spinous processes are not yet formed, and the intervertebral substances placed between the bodies have not yet acquired their proper consistency.

Fig. 1. An anterior view of a Fœtal Spine.

a. The bony deposit formed in the centre of one of the bones of the spine.

b. The cartilage in which the bony deposit has been formed.

Fig. 2.* A back view of the same Spine.

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* The preparation is in the Museum of the Middlesex Hospital.

Fig. 1.

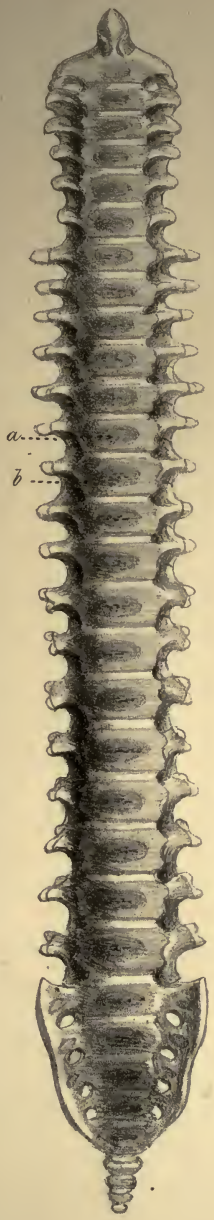


Fig. 2.

Drawn on Zinc by G. Scharf.

a. The situation at the side where the bone is formed which passes to meet a similar portion on the other side.

b. The transverse process, quite in a cartilaginous state.

c. A space between the back part of the spine, filled up by ligament: above the space the situation of the spinous process may be observed; these processes are not formed in this young spine.

Thus, then, it will be observed that the transverse processes are developed long before the spinous processes, on account of the muscles of the spine and those that support other parts of the body being attached to them, with a view to maintain the spine in a position that it may not fall on either side. The spinous process is the last part of the bone formed; the muscles attached to these processes support the head and upper extremities; and as their weight is not so soon thrown upon the spine, it is presumed that nature first forms those parts which are best adapted to support the body, and give strength to the frame.

For the purpose of giving the reader a complete knowledge of the formation of the spinal column, I have introduced another plate of a spine, further advanced in the ossific process.

Plate II.* Fig. 1. A front view of the Spine of a Fœtus, with the ossific process more advanced.

a. The bony deposit in the centre of the body of the vertebra.

b. The cartilage surrounding the ossific deposit.

Fig. 2. A back view of the same Spine.

a. The commencement of the ossific formation at the side of the lateral part of the vertebra.

b. The transverse process ; the other processes may be seen to correspond with the one marked.

c. A space where the spinous process is afterwards formed.

The process of ossification gradually continues until the several bones are completely formed.

The body of the vertebra, when complete, is of a spongy texture, surrounded by a harder ring of bone. The bodies are broader from before backwards in the dorsal vertebræ, and broader laterally in the lumbar vertebræ.

The bodies of the vertebræ increase in size, each lower one being larger than the one above ; they do not, however, increase in density and firmness of texture, so that the lower vertebræ, although larger, are not so heavy in proportion as those above them. This is an object of importance in a part of the body where lightness is an essential

* The preparation is to be seen in my collection in the Museum of the Middlesex Hospital.

Fig. 1.

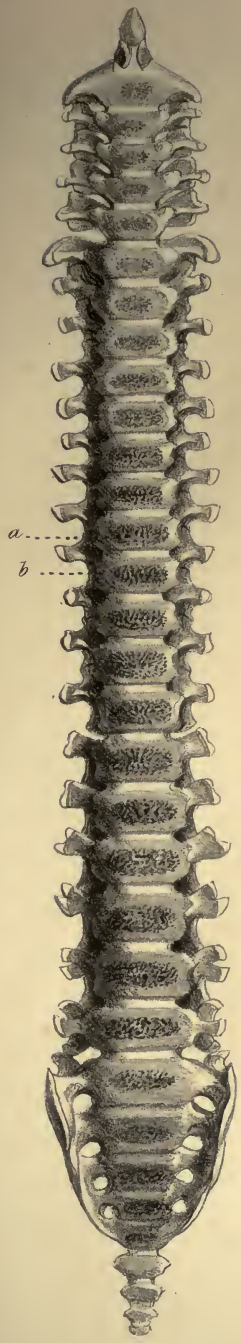
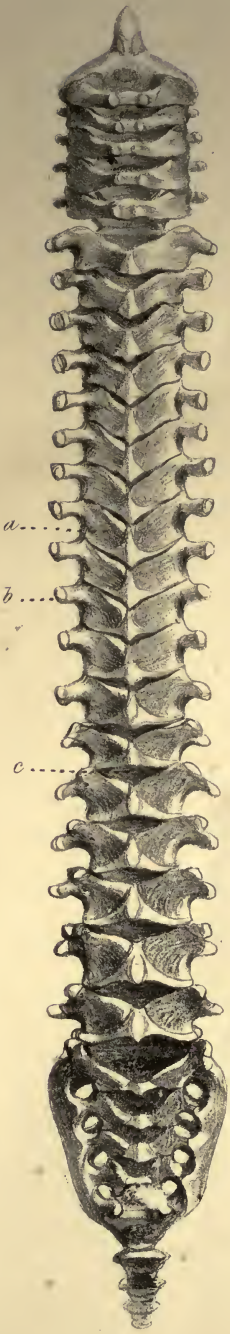


Fig. 2.



Drawn on Zinc by G. Scharf.

property, in addition to flexibility and pliancy. The bodies of the vertebræ are united together by a substance compressible like cork, forming a kind of partition, termed intervertebral substance, which in the fœtus is of a ligamentous structure, but becomes more like cartilage, or of a consistence between the two. It is composed of concentric, curved fibres, harder externally, becoming soft towards the centre, so that the motion of the spine may be facilitated and increased.

The intervertebral substance, placed between the bodies of the bones of the spine, is divided by a membrane, covering and firmly joined to the body of the bone: it is of a fibrous structure, and resembles in some degree the periosteum, but may with more propriety be compared to the membrane placed over the cartilage that covers the ends of the cylindrical bones, although there is still a difference between them. This membrane, covering the upper and lower part of the bodies of the bones of the spine, may be considered a continuation of the one that covers the other parts of the vertebræ. It is, however, thicker, more fibrous, and may be with greater ease divided into layers. It may be here stated, that in some post-mortem examinations of diseases of the spine, this mem-

brane may be easily removed from the structure of the bone; whereas in a healthy subject it is a matter of extreme difficulty. The separation of this membrane, in such cases, appears to me to resemble the separation of the membrane covering the end of the os femoris in certain cases of disease of the knee-joint; and I am of opinion, that in some diseases of the spine, the primary seat of the affection may be traced to this membrane; according to this hypothesis, chronic inflammation commencing between it and the bone, pus becomes deposited from the increased inflammatory action, and the bone itself ultimately runs into a state of caries by being placed in contact with the matter.

There are numerous ligaments which bind each bone together, and serve to connect the whole so as to support the weight of the head and extremities. In each bone, when fully formed, there is a foramen large enough to admit the point of the finger, which corresponds with that in the adjoining vertebra, and is occupied by the spinal marrow, its coverings, and blood-vessels. Between the sides of the vertebræ there is a depression, formed by the union of the bones, into a foramen for the exit of the spinal nerves and small vessels to nourish the bones and spinal marrow. On each side of the vertebræ there

is a transverse process, the first of which, that proper to the atlas, projects more than the transverse processes of the other cervical vertebræ, in which and in the other transverse processes of the neck, there is a foramen for the passage of the vertebral artery. The transverse processes of the dorsal vertebræ have an articulating surface for the tubercles of the ribs, so that the dorsal are easily distinguished from the other bones of the spine. These processes serve to give firm attachment to numerous muscles employed in moving the spine, and in supporting the head and the extremities. On either side of the lateral part of the vertebræ there is a slanting process, called the oblique, upon which we see the articulating surfaces that unite the bones to each other. At the back part of each bone, except the first, there is a spinous process, which projects backwards, and is sometimes bifurcated. This is worthy of remembrance, for when these processes are traced, an irregularity may consequently be found, which might be mistaken for curvature of the spine. The spinous process of the second cervical vertebra, the Dentata, projects almost in a direct line backwards; the other spinous processes gradually pass downwards, until we arrive at the fifth, which directs its course more

backwards: the other two pass more in a backward direction. The first dorsal spinous process passes somewhat more downwards; the others gradually run down in the same direction, until about the middle of the dorsal vertebræ, when these processes nearly overlap each other: the lower dorsal spinous processes pass gradually backwards, and the last one more so than the former. The spinous processes of the lumbar vertebræ are shorter and broader than the others: they pass gradually backwards, and the one proper to the last bone of the spine, somewhat upwards as well as backwards.

The direction which the spine takes in a normal condition is necessary to be kept in remembrance, and a lateral view of the spine will better enable us to understand its natural curves, formed to bear the weight imposed upon it. In the neck, the bodies of the spine project forwards, for the purpose of supporting the head, which otherwise would require a greater number of muscles: in the dorsal vertebræ the spine forms a concavity, for the purpose of containing the various viscera of the chest, and to afford more room for the lungs, heart, and large blood-vessels. In the loins the spine again projects forwards in a direction with the centre of gravity, whereby the body is kept in the

erect position, or otherwise we should be liable to fall forwards: the false spine is curved out at the anterior part, to contain the pelvic viscera.

The spine is constituted of so many distinct pieces, in order to protect the spinal marrow, and prevent any pressure upon it while the body is bent: if it had been formed only of three or four bones, when the body was moved to either side, an angle would have been produced, and pressure against the spinal marrow might have been the result. The motion of the body is increased by its being formed of so many bones, the nerves are allowed to pass out between them, and it is rendered elastic by the substance placed between each bone. This formation, in case of any fall, protects from concussion the brain and spinal marrow, and in case of fracture, it is prevented from extending, by reason of the bone being so small. The irregularity of the several processes is to enable numerous muscles to take a firm attachment, so that the body may be freely moved in all required positions, which may be increased by practice and exercise: we see proof of this occasionally in the public streets, where boys, and even men, bend their backs in an extraordinary manner. When we contemplate the construction of the spine, the liga-

ments, the minute composition of its internal texture, and the numerous parts intimately attached to it, we cannot wonder that it should be the seat of various affections, and be subject to disease.

The internal composition of the bones of the spine is of a light cancellated structure, the dorsal more so than the cervical, and the lumbar in a greater degree than the dorsal; but to strengthen these bones, a hard shell of ossific matter surrounds the anterior and lateral part of their bodies.

The bones of the spine are nourished by arteries, which enter each bone by three distinct places, the one at the back part of the body, the other two at the inner side of the lateral parts of the vertebra; so that the three pieces which primarily form the bone are at first distinctly and separately nourished by the blood-vessels, but afterwards, no doubt, there is a free communication between these vessels. The veins that return the blood from the bones of the spine, pass out with the arteries; they run in the cancellated structure of the bones, in the same way as in the bones of the head: the veins are of a large size, while the arteries are much smaller, and more numerous. The bones are also furnished with nerves and absorbents, for the spine

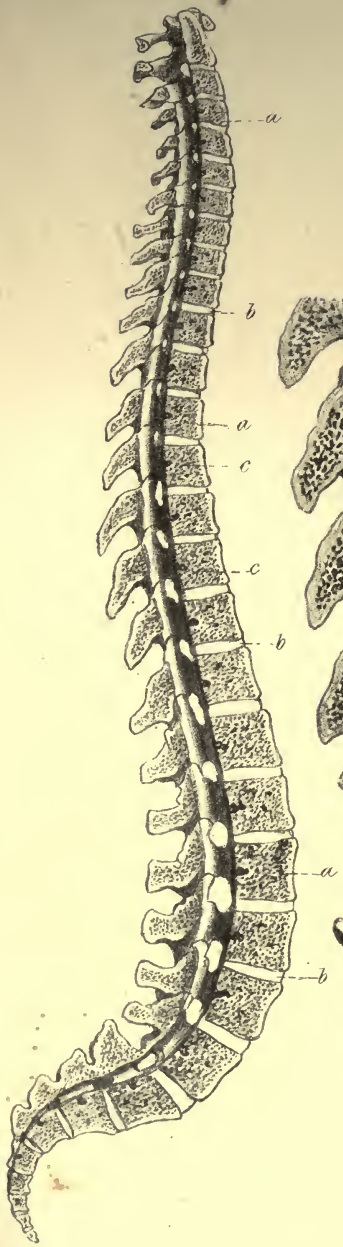
is subject to the same law as the other bones of the body, of waste and renovation, the deposit of fresh material, and the removal of other particles, so that a constant change is going on; but the deposit gradually increases, and the absorption is not equal to it, and therefore an increase in the size of the several bones takes place during a certain period of life, constituting their natural growth.

When we view the internal structure of the bodies of the vertebræ, and know that their minute composition is constantly undergoing a change, we cannot be surprised, if this function of nature be not carried on with health and vigour, or if accidental violence should produce in their structure any change, that disease should follow. Suppose that by the tightness of stays the proper absorption and deposition should be so impeded as to affect the strength of the bone, and render it incapable of sustaining the gradual increase of the body, we can very easily imagine that their structure must yield to a weight for which it is thus unprepared, and that curvature of the spine would be the natural result. Consequently, a knowledge of the cause or nature of the disease affecting the spine is most essential, to decide upon the proper treatment to remedy the defect; and every possible caution should be taken

to assist nature in the performance of the proper formation, and the increase of the growth of bone; because if this be accomplished, we acquire a very great advantage, inasmuch as the strength of the bone will increase with its growth; and when it has acquired its proper consistency and hardness, it is enabled to answer its natural purpose, namely, to sustain the weight of the other parts of the body. Now as this process cannot go on with advantage to patients unless they are in a state of health, it becomes of the first importance to regulate the diet, exercise, and every trivial circumstance relating to bodily health.

I would remind the reader of the necessity of clearly understanding the position of the spine in a healthy state,—the curves it forms at its anterior part to receive some of the viscera,—the direction in which the spinous processes project,—the structure of the bodies of the vertebræ,—and the manner in which the several parts are nourished and connected together, so as to constitute the uniting medium of all the parts of the frame; for the knowledge of the healthy structure, shape, and proper development of any portion of the body enables us at once to discover any derangement. For this purpose, the following plate has been considered desirable.

Fig. 2.



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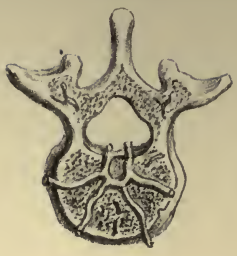

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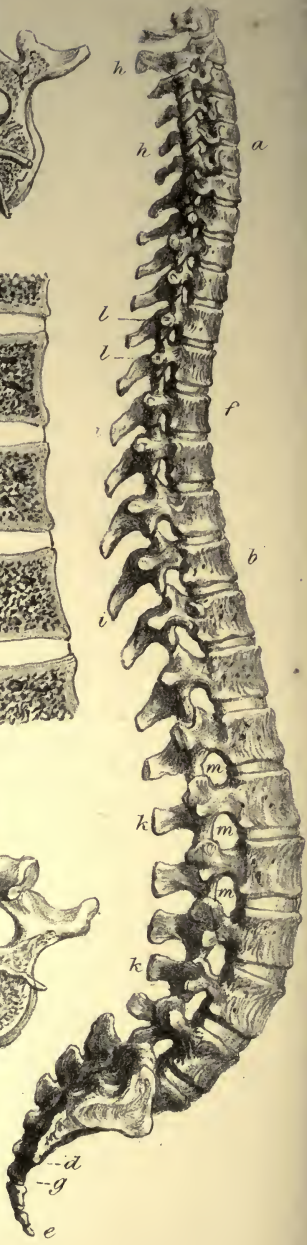

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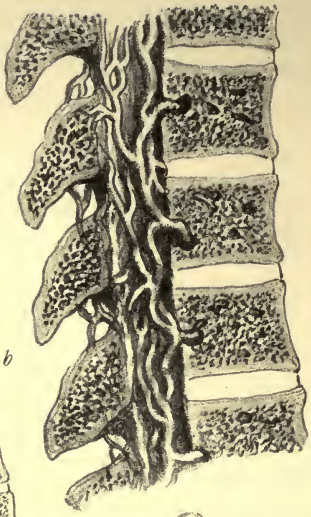

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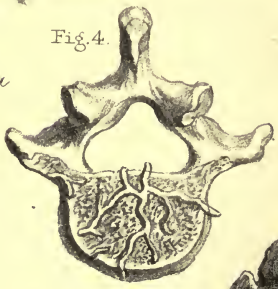

From Nature & on Zinc by G. Scharf.

Plate III. Fig. 1. A lateral view of the Spinal Column.

a. The seven cervical vertebræ.

b. The twelve dorsal vertebræ.

c. The five lumbar vertebræ. These twenty-four bones constitute the true spine.

d. The sacrum.

e. The os coccygis. The two latter form the false spine.

f. The concavity formed at the anterior part of the dorsal vertebræ for the thoracic viscera.

g. The concavity formed for the pelvis viscera.

h h. The spinous processes of the cervical vertebræ.

i i. The spinous processes of the dorsal vertebræ.

k k. The spinous processes of the lumbar vertebræ.

l l. The transverse processes.

m m m. The foramina formed between the vertebræ for the transmission of the nerves, &c.

Fig. 2. A longitudinal section of the Spine, showing the canal where the spinal marrow passes.

a. The bodies of the vertebræ, extremely cancellated in their structure, each surrounded by a harder plate of bone.

b. The situation of the intervertebral substance.

c c. The situation where the vessels enter for the nourishment of the structure of the bodies of the vertebræ.

Figs. 3 and 4. A section of two vertebræ, for the purpose of showing the minute cancellated structure of the bodies of the bone, and the way the vessels pass for its nourishment.

Fig. 5. A section of a part of the Spine, showing the cancellated structure of the bodies and spinous processes of the vertebræ; the veins are seen passing out of the back part of the bodies of the bones, and form a reticulated set of veins that pass within the spinal canal.

It is presumed that a careful perusal of the preceding pages, and an attentive examination of the plates on the anatomical structure of the spine, have enabled my non-professional readers to form a just idea of the anatomy of this part of the frame, and to acquaint themselves with the manner in which it is developed, and attains that structure and strength, so requisite to support the whole of the body, of which it becomes the grand connecting medium. I shall now, therefore, point out the various affections and diseases to which this part of the body is liable, and which produce deformity of the chest, trunk, and pelvis, and many symptoms which in some instances may be attributed to other causes than to spinal disorder.

Affections and diseases of the spine are of *two kinds;* those peculiar to the *spinal marrow*, and those affecting the *vertebral column.* The former are most highly interesting, as they teach us many physiological facts, which enable us the better to understand the nervous system, the functions of the spinal marrow, and many points of which we might otherwise have remained ignorant; but the limits of these pages are too confined to allow me to enter into their details. I have therefore

deemed it expedient in the present instance to enter upon the latter subject, and to treat solely of the diseases of the vertebral column.

The vertebral column is subject to a variety of affections, and frequently becomes the seat of disease, producing deformity of the chest, trunk, and pelvis, by the spine bending under the weight it was intended to support; and we may consider this as the first class of affections of the spine, producing its subsequent deformity.

The vertebral column may also become in a diseased state, and still be capable of supporting and maintaining the weight that is upon it, and therefore the body will be free from deformity; and I may be allowed to name this as the second class of the diseases and affections of the spine.

In the first or former class of these affections and diseases, I shall place *lateral curvature*, both primary, and the result of the abnormal condition of some other parts of the body,—*anterior curvature*, or incurvation of the spine,—*posterior curvature*, or excurvation of the spine,—*angular projection*, caused by caries of the bones, or disease in the intervertebral substance, and *spina bifida*.

In the latter class I shall place *lumbar* and

psoas abscess ; abscesses caused by disease of some of the vertebræ, and common to both classes ; *chronic inflammation* of the cancellated structure of the bodies of the vertebræ, or intervertebral substance, or surrounding membrane; and *injuries* of the spinal column, which may occur, and produce or not deformity or a derangement in the position of the spine.

These two classes of affections and diseases of the vertebral column I shall now proceed to consider separately in the order in which they have been named ; and I shall venture to recommend a plan of treatment, which after much reflection and deep attention to the subject, I have in many cases successfully adopted, and which has stood the test of experience, and harmonizes with the soundest principles of anatomical knowledge and physiological research.

In the first class I have enumerated those which ultimately produce deformity of the chest, trunk, pelvis, &c., the primary seat of such unnatural shape of the body being in the spinal column, or those parts that enter into its formation, so that the deformity is the consequence of the primary affection. This should be constantly kept in mind by all those who hope successfully to treat such cases,

otherwise their attention might be directed to counteract the mal-position assumed by the trunk; whereas their first object should be to ascertain, by all the means in their power, from what cause the spinal column itself first became affected. The removal of such cause or causes, if possible, should be the first object. To illustrate this, let us suppose the following case. A practitioner is consulted in consequence of a growing out of the right shoulder, or a projection of the chest on the left side; he immediately directs his attention to the removal of this deformity by pressure, by mechanical or other means. But how can he accomplish the desired end, whilst the cause of the deformity is the affection of the spinal column, and it remains unattended to? We need hardly reply in the negative: the failure is self-evident. But if he succeeds in ascertaining the cause of the affection of the spine, and he should clearly be convinced that it may be ascribed to tight lacing, want of exercise, or any other cause, he would at once endeavour to remove and to counteract such a predisposing tendency, and induce the spinal column to acquire the strength and health so necessary to the fulfilment of its very important duties,

and to the development of a good and natural figure.

It must appear obvious to a reflective mind, that this is the only safe and legitimate mode of proceeding to treat, not only affections of the spine, but all other diseases to which the body is subject. At the same time there are difficulties that often present themselves to us, in finding out a cause for the affection or disease for which we are called upon to apply a remedy. Investigating the habits, the diet, the mode of living, the propensity of the patients; their natural disposition; the examination of the body, and due reflection upon the shape of the deformity, will in many instances assist us to form our opinion as to the probable cause of the affection; but our conclusion must not be formed upon a first examination, or without a careful and deliberate investigation of every circumstance.

I presume that sufficient reasons have been advanced in support of this doctrine, to induce the reader to agree with me on this point, namely, first to ascertain the seat and cause of disease. He will assuredly see further ground for concurrence in this opinion, as I proceed to the consideration

of the separate affections, to which the spine in so many cases is subjected; and therefore, without further comment, I purpose to lay before him, in as clear and perspicuous a manner as I can, the causes, nature, and character of these diseases.

LATERAL CURVATURE OF THE SPINE.

This deformity of the vertebral column may arise from various causes, which will produce the same result; namely, an inclination of the spine to grow out of its normal state, forming a concavity on the one side, and a projection on the opposite. This may be either the primary unhealthy condition of the vertebræ, or it may be the result of morbid affection of some other parts of the body; as, for instance, disease in the hip, knees, ankle, foot, or a shortening of either leg. In such cases nature labours to accommodate herself by *bending the spine*, to enable the patient the better to place the foot on the ground, and thus the spine is not the primary seat of disease. I shall therefore, for perspicuity sake, call it the secondary result, and term the one lateral curvature, and the other secondary lateral curvature. The former I shall first describe.

Lateral curvature of the spine produces two dif-

ferent states of the vertebral column; the one a debilitated or softened state of the structure composing the several bones, the surrounding membrane, and the ligaments in general, rendering the spine weak, soft, and incapable of giving that support to the body which it should do in a healthy state; the other the result of disease, caries of the lateral part of the bodies of the vertebræ, or ulceration of the intervertebral substance, with a loss of structure, and consequently a loss of support to that side of the body which the disease affects; and thus the weight of the frame, together with the action of the muscles, draws the body to one side. The former may be considered as the simple form of the disease; the other is of a more formidable kind, and the most serious to the patient; and this affords another proof of the necessity, both as regards the treatment and the welfare of the unhappy sufferer, of forming a correct and accurate diagnosis as to the state of the spinal column. Each form of the disease will require, of course, a distinct and separate mode of treatment; for should the same plan be followed in both cases, a cure might be effected in the one, and an increase of the symptoms, and fresh deformity in the other: and here we may see the great absurdity of recom-

mending the same plan of treatment in all cases of affections of the spine, some advocating the recumbent position, some extension and rest, some extension and pressure, some the use of instruments, others exercises of the muscles; in fact, each man has his separate plan and mode of treatment, which he declares to be the only proper one. But can any scientific person, or any one possessed even of common understanding, believe that the same treatment can be beneficial in all the different cases of diseases to which the spine is liable, and which will be enumerated in these pages? Surely, on the contrary, we must deprecate the ignorance of the advocates of so absurd a theory. They betray a lamentable want of knowledge of the subject. The public are deceived by their pretensions to skill, and the sufferings of those who unhappily are afflicted by this most serious evil, are prolonged and increased in a very great degree by the misapplication of adequate remedies.

The simple form of lateral curvature, where there is no affection of any other part of the body causing the spine to become crooked, generally makes its appearance a few years before the age of puberty, and often attacks females in the higher circles of society. The poor are seldom, if ever, afflicted with this form

of the disease; and in this they have the advantage over the wealthy, which may perhaps surprise some of my readers, who may be inclined to doubt the accuracy of the statement, that the rich heiress, with every comfort, care, attention, and luxury of life, should be more subject to it; but it is nevertheless true, and arises, I apprehend, from the ill-constructed and fashionable mode of dress adopted by the upper classes of society, and is increased in great degree by their system of education and sedentary habits. The attempt to alter the natural figure of the body by tight stays and tight lacing,—the want of proper and daily exercise, by which the health is preserved, and the body enabled to carry on its various functions, cannot be too strongly condemned: such practice prevents the several parts comprising the minute structure of the fabric from acquiring their natural growth and proper strength. Let then parents stop and reflect upon this important statement, and startling fact; let them hesitate to sacrifice to fashion and appearance the health of their offspring, and render them subject to this form of the complaint; let them not delude themselves with the vain hope, that because some children have strength and health to arrive at the age of maturity without any appear-

ance of disease, without any apparent deformity, that their child may be equally fortunate. I would warn them that by following the same fashionable mode of dress, the same plan of education, their children are at least rendered liable to a crooked spine, or projecting hip, or may become pigeon-breasted; and to a variety of ill consequences, which it is in their power to prevent by proper management and attention. Let them therefore but diligently follow that mode which nature dictates, and which, if properly and regularly persevered in, will lead to health, strength, and a beautiful development of the body;—to an admirable symmetry of figure unequalled by art, the sole result of a proper growth of the frame.

That females of the higher class are more subject to this species of deformity of the spine, there can be but very little doubt; and I affirm this from personal observations made during a period of nearly twenty years; but since doing so, the following statement has been published in the Lancet, vol. i. 1839 and 1840, No. XIX. page 690, by Mr. Verral: "There is one more statement of Mr. Thompson, "to which I am impelled to refer, because I think it "capable of making a false and unfortunate impres- "sion on the public mind. It is remarkable, he

" says, that lateral curvature is very rare among " the poor ; in five years I have met with but seven " cases, and these, he adds, were child-maids, or " maids of all work. Mr. Thompson must have been " little consulted by the poor, and has therefore not " had to grapple with spinal distortion in its more " terrible form. In three years (Mr. Verral states,) " from the establishment of the society for the treat- " ment at their own homes of poor persons afflicted " with disease and distortions of the spine, chest, " hips, &c., I have met among the poor more than " fifty cases of lateral curvature, of which several " were males, and of the remainder, but very few " were child-maids, or maids of all work." I presume that those alluded to by Mr. Verral, were most of them cases of lateral curvature, arising as a secondary result, and not the simple form of the complaint; for according to the published account of patients admitted into the Middlesex Hospital,*

* Patients admitted at the Middlesex Hospital.

	In-Patients.	Out-Patients.
1835	1691	4495
1836	1714	4579
1837	1805	4444
1838	1973	4718
1839	2143	5429
	9326	23,665
		9,326
		Total 32,991

it would appear that in the period of five years, very nearly thirty-three thousand patients, suffering under every kind of disease, were relieved at that establishment, and among this number, not more than twenty cases of lateral curvature, as a primary deformity, presented themselves to our treatment. Thus, then, from this statistical account, and from my own observations, I must beg to agree with Mr. Thompson in his views of the comparative rarity of this form of disease among the poorer classes.

The common practice with nurses, of binding the body of a newly-born infant tightly round with a roller, cannot be too strongly condemned; and the sooner such practice is discontinued, the greater will be the advantage to the rising generation. For if we consider that the infant has just become capable of inhaling the atmospheric air,—that the muscles are making every exertion to dilate the cavity of the chest, to receive such air, to arterialize the blood, and enable it to nourish the several parts of the frame, for their increase in strength and health; how absurd is it to allow the body to be bound round, thus preventing nature in the performance of her functions, and at once running counter to her laws, in obstructing the act of respiration! This is too commonly the first act towards

injuring the health of children, and not the only one they are obliged to endure. I can perceive no possible advantage to result from this practice, which being contrary to the laws of nature, and tending to obstruct her power, and molest her laws, stands self-condemned.

The utility of allowing free action to the chest, to enable the lungs to be filled with pure and fresh air, is indeed of vital importance, as this must be regarded as the primary and one of the principal sources of nourishment, and of giving vigour and strength to the several component parts of the frame. The very act of the infant's crying is attended with beneficial consequences, as the chest then becomes distended, and the lungs filled with air, which enables the blood to be better arterialized. It will be obvious that much may be gained by proper attention being paid to the heat of the chamber, so that the atmosphere may be of a proper temperature; that the room be not too confined, lest the air should become impure, and consequently not so capable of promoting the function of healthy respiration; at the same time a proper heat in the room is essential, for the air being either too damp or too cold may tend to equal disadvantage.

Ablution, or bathing and sponging the surface

of the body, is of the greatest use in promoting strength and health, and the proper performance of the several functions of the animal economy, for no part of the body sympathizes so much as the skin with the other parts of the frame. Water of a proper heat may at first be used, and gradually reduced in temperature, till the individual becomes accustomed to its use in a cold state; and benefit will very frequently result from the use of sea-water, or in its absence a solution of bay-salt and water: friction after the use of such bathing will be of much service, and the body may be rubbed dry with a towel, not too fine. Some of my readers may have experienced the glow upon the skin after bathing,—the lightness of the body, the vigour of the muscles, the vivacity of the spirits, benefits resulting from its effects; and they will be the better able to appreciate the usefulness of thus continuing to assist the general health, and consequently of increasing the strength of all parts of the body by every means in their power.

It is stated in another part of this volume that physiological researches lead us to understand that there is constantly a change taking place in the various parts of the body; the absorbents are in

action taking up a portion of each structure of the several component parts of the frame, while a fresh deposit takes place; but these two do not equal each other, the deposit exceeding the absorption, by which means the body grows, and increases in size, according to the various ages of life. To promote a due performance of this important function, exercise is essential; and it is worthy of observation, that the bones which are first required for use are the first formed; thus at birth, the ribs, the clavicle, the bones of the internal ear are ossified, and the new-born being has power to cling to its mother, to hear, and becomes accustomed to the various sounds: in a short time afterwards the infant is capable of making use of the hands, for the bones entering into their formation become more developed, and increase in strength and structure; the feet increase in strength as the bones gradually become ossified, and the child gains the power of standing. The pleasure then shown, when the child bears the weight on the feet, must be manifest to most people; exercise is gradually taken, and the process of growth rapidly increases during this time. Waste and renovation go on, the latter gradually and daily exceeding the former, producing the growth and proper formation of the various parts of

the frame. This process continues during the whole period of life, but the development of bone is usually complete a few years beyond the age of puberty. Thus it would appear that exercise assists essentially the formation of bone, the hardening and development of its structure, by which it becomes capable of supporting the other parts of the body; and is it not important that we do all in our power to assist nature in the accomplishment of such an important function? Those of my readers who have observed the growth of youth, must have seen the frame gradually expand, when the child has been allowed a proper degree of exercise, with suitable food and clothing, except in the case of some predisposing cause for disease.

If then this process of nature goes on so well in youth, under the circumstances above detailed, why should we obstruct her progress by any interference with her laws, by binding the body with rollers, or confining it by stays, preventing the action of the lungs, the exercise of the muscles, the motion of the spine, the free action of its several bones, and other parts entering into its composition, under the delusive notion of producing a good, or what is called a fashionable figure? whereas such improper practice too often ends in deformity, ill health, and disease.

It has been before stated, that exercise is of much importance in promoting the development of bone, the health of the frame, and the due performance of the several functions of the body; and should any part become debilitated, will be of use in restoring its strength. We have an example of this in the muscular system, and in the several joints of the body; we find that by proper training and exercise, the several parts increase in strength, enabling the body to perform more than ordinary feats of activity and power. When, therefore, certain parts of the human frame suffer from debility, exercise will greatly assist in restoring their strength, tone, and circulation.

For this purpose, appropriate exercise should be used at proper periods of the day, and not carried to such excess as to create fatigue. It would be improper to put the body in action after a meal, for rest is then essential to the purposes of digestion and the assimilation of food. It follows, therefore, that before meals, the body should be exercised, which would increase its muscular strength, improve the powers of digestion, and generate a healthy state. During the time devoted to this purpose, the mind should be amused by such exercise being pleasing and agreeable. Various

kinds may be adopted, either before breakfast or three hours afterwards, or before, or at the same time after any other meal, in a large room, properly ventilated. But the present mode of education is prejudicial to the general health of the female sex, who are doomed to very many hours of sedentary employment, perhaps the greater portion of the day, without affording to many of the muscles of the body a proper degree of action, so necessary to keep them in a salutary state. Under such defective management as regards health, the greatest of all blessings, we need not wonder that the young lady thus deprived of the natural means of vigour and healthfulness, should possess a body without shape or proportion, and eventually become the subject of spinal affection,—the unhappy victim of folly and fashion.

Lateral curvature, then, is more common in the female, from these causes, than in the other sex; for the latter is allowed to run about with perfect freedom, to move the spine in any and every direction: his muscles are not confined, they are freely used; and thus nature is assisted in the complete development of the bones of the spine, as in the other parts of the body. The heart becomes strong and healthy, the chest broad and expanded,

the respiration free, the circulation carried on so as to benefit the minute structure of the frame. The female, on the contrary, is often tightened round the waist, the ribs are compressed, the respiration obstructed, the circulation impaired, the minute structure of the spine enfeebled, the process of renovation impeded, the muscles of the trunk kept in lassitude, the cavity of the chest altered, and instead of the lower part of the thorax being the largest, as nature formed it, it is the narrowest, and the upper part is enlarged. Thus the chest becomes completely changed to a state of deformity, and this state arises from irrational compliance with the fashion and false taste of the day, which would form a young lady's waist

"Small by degrees, and beautifully less."

But this is not all the derangement resulting from so bad a practice; the several viscera both of the chest and abdomen are compressed, and pushed out of their proper situation, changed in their shape, and their proper functions interrupted. The patient feels headache, palpitations, and various unpleasant sensations, brought on solely by tight-lacing. The shoulder often grows out, the spine is observed to be twisted; and by the ignorant and un-

skilful tighter stays are used; and thus instead of remedying the deformity, it is alarmingly increased, by pursuing the very means in which it originated. The bones then become softer, the spine weaker, and less capable of maintaining the weight attached to it; the sufferings of the patient increase: the shape that was once natural, the constitution that was once good, the bones that were rapidly attaining their proper growth and substance, the health that was once vigorous, these are all impaired, all injured, and the form of the body rendered unnatural and disproportionate. I refer the reader for confirmation of my remarks to the accompanying plate;* on the one side the trunk is seen of its proper natural shape; on the other, the deformed condition to which it has been brought by pressure and tight lacing; and I leave it to those who view both these forms, to decide which is the most beautiful, that of nature, or that of art; the one exhibiting health and strength, the other weakness and deformity.

In addition to other evils resulting from tight lacing, the bones of the pelvis are compressed, and

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* Plate IV. Fig. 1. The natural shape of the chest.
Fig. 2. The shape of the chest produced by tight lacing.

liable to become contracted, producing the worst consequences, for instead of the cavity being expanded to contain the viscera, the bones are drawn together, the contents confined within an unnatural compass; and thus the functions of the whole body become impaired, and pass into an unhealthy state.

When the parent observes her offspring gradually losing strength, perhaps becoming daily weaker, I would strongly recommend the plan pointed out in the preceding remarks. I repeat them as being of primary importance, and well calculated to restore health, and prevent the severer applications to which the disease, in its more fearful advancement, must subject the patient. First, let the body of the child be free from pressure; let the muscles have proper action; let exercise be moderately used, and at proper periods of the day; let the spine be spunged daily with sea water, bay salt and water, or pure water, and let the food be properly attended to. It is also most necessary that growing children should not be permitted to retain one position too long at a time; let them have the free use of their limbs,—amuse the mind. Follow these instructions for the short period of three months, and I am persuaded that an improvement will take place, unless the functions are

so much impaired by weakness as to require the aid of medical skill. Health surely, as being the greatest blessing we derive from the hands of Him who made us, requires a proportionate attention on our part for its preservation and continuance; and little indeed do we display our thankfulness when, in compliance with fashion, we pursue the course of all others the most likely to render this good gift unavailing. If these remarks should fortunately meet the eye, and convince the judgment of the many tender and anxious parents who move in the more distinguished ranks of life, and they will attend to the directions set forth in this little treatise, lateral curvature will probably soon cease to be found among us.

The poor have this advantage over the rich, that they are allowed to use the muscles freely, uncontrolled by pressure; and the spine thereby acquires strength. In the lower grades of life, those parents only who follow the example of their superiors, have the misery of seeing their children subject to lateral curvature.

In the growth and form of the body, nature must be our best guide, and she should be assisted by us on all occasions. In accelerating her purposes, our best judgment is required. We have seen what

may be the result of a contrary plan. An instance is known where a young lady prided herself on having a waist which one of her companions at school could almost span, supposing that her figure was more fashionable and elegant; but the result was, she became the victim of disease, and died, suffering the greatest agony, brought on solely by such unreasonable interference with nature's laws. At the same time be it understood, that I do not entirely condemn the use of support or of stays, when they are so constructed and applied, that the bony structure shall not suffer.

Pressure applied to any part of the body produces absorption, that is to say, a decrease in the structure of that part; and we may see many examples of it in surgery. If we look at the feet of a Chinese female, the bones are rendered soft by pressure, and modelled into any shape by the shoes that are placed on them. So may the other bones and the spine of youth be similarly softened; and partly by like means may deformity be relieved, and the body restored to a natural shape; and this remedy may be used with greater chance of success when the deformity is slight, and not of long standing, and also in youth, when the various parts of the body are but attaining their natural growth. Let not

proper exercise, and its natural growth induced and encouraged.

These causes of lateral curvature must not be regarded as the only ones that produce this affection of the spine, but they may be considered as most frequently leading to the existence of this complaint, and are perhaps the easiest to remove. There are other causes which will produce lateral curvature: a debilitated constitution; a scrofulous habit of body; a weakened state of the circulating system, brought on by the infantile diseases too quickly following each other; hereditary predisposition to disease, arising from syphilis, scurvy, cancer, &c. Rickets and mollities ossium may likewise occasion the deformity.

It becomes therefore essential that a proper and correct diagnosis be formed as to the cause of the complaint, before any plan be laid down for the cure of the distortion; and thus even in one of the several affections to which the spine is subject, we see the absurdity of laying down any general mode of treatment that must avail in all cases. This is too much like the empiricism of the present day. I feel it necessary to delay the statement of the remedies which I think will be most conducive to the restoration of the patient, until I have entered

somewhat more fully into the causes of the distortion.

Lateral curvature of the spine arising from the non-consolidation of its parts, produced by tight lacing, stays, and the application of external and improper pressure, and accompanied by want of action of the muscles of the back and those of the chest, is not very easily distinguished from lateral curvature brought on by other causes. The shape of the trunk, however, the size of the waist, the general habit of body, and the age and constitution of the patient, and also the duration of the deformity, are points which must necessarily govern our opinion of its cause.

We may consider that such deformity is caused by mere local application obstructing the natural growth or development of the vertebral column, and not by constitutional causes, or hereditary predisposition to disease; yet the constitution may ultimately suffer from a continuance of the local application, and it becomes necessary to ascertain the general health, habits, and constitution of the patient; whether the trunk has undergone tight or loose pressure; whether stays have been constantly worn; what exercise has been taken generally, and at what period of the day;

and whether the body has suffered from fatigue. These are points which, together with the opportunity of examining the state of the deformity, will materially assist us in deciding upon the original cause. And if upon enquiry we find that the child in its infant state was healthy, but that the body was subjected to bandage, and when at school, was confined to one position without sufficient exercise; that a projection of one shoulder was first discovered; that tighter stays were applied, and curvature of the spine observed; that constitutional symptoms made their appearance; and upon examination of the patient we found the waist small, the chest contracted, and unnaturally lengthened, the last rib approaching the bones of the pelvis, the patient's age being between eight and sixteen years, the medical practitioner might fairly conclude, that the cause of the deformity arose from local application, and not from constitutional indisposition.

In the one case, of disease brought on by local application, the removal of the cause of the deformity will at once be obvious to the practitioner. In the other case, benefit must result from medicinal treatment, so as to improve the health of the constitution; and this of course must be regu-

lated by the cause of the spinal affection; whether a scrofulous habit of body; a weakened state of the circulating system; hereditary predisposition to disease, arising from syphilis, scurvy, cancer, &c.; or rickets, and mollities ossium; each of which requires a separate plan of medical treatment.

Lateral curvature arising from a softened state of the spinal column will often produce constitutional symptoms, which will be more or less marked according to the pre-existence and progress of the deformity. They will increase with the deformity, and with the obstruction to the functions of respiration, circulation, digestion, and secretion, and will gradually subside as the spine is rendered straight. They may therefore be viewed as the result of the deformity. Remove the cause, and these symptoms will necessarily disappear.

I wish it to be distinctly understood, that the weakened or softened state of the spine already alluded to, is brought on by, and dependent upon, the non-consolidation of the bone, the spine not participating equally with the other parts of the body in the acquirement of strength, and that this is quite distinct from constitutional causes; and lest I may be supposed to lead the reader to imagine that it is a mild form of rickets, or a form of

mollities ossium, I subjoin the following distinctive characters of these three affections of the spine.

Rickets, a soft state of the bones, occurring mostly in children, but sometimes taking place after the time of childhood, caused by constitutional derangement. Involved in much obscurity.

Mollities ossium, a morbid softness of the bones, preternaturally flexible in consequence either of the inordinate absorption of the solid part, or the want of its secretion; occurring generally beyond the middle period of life, mostly, if not always, in women. Dependent upon constitutional derangement.

A weakened or softened state of the vertebral column produced by external application, the development of the ossific process of the spine not keeping pace with the other bones of the body. Not dependent upon constitutional causes, but from the application of improper pressure externally.

It will be seen that the difference between the three consists in this, namely, that the last-mentioned affection of the spine is produced by, and dependent on, local causes; whereas the other two result from disease brought into action by constitutional disturbance; consequently the one is a much milder species of the deformity than the other two, and more easily

removed, and the spine brought into its proper shape, and the health and strength restored.

Other causes than those which I have enumerated are mentioned by authors as producing lateral curvature. Some attribute it to the unequal growth of the bones of the spine; that is to say, to the bones on the one side increasing in their structure in greater proportion than the bones on the other side, or else to the pressure on the one side being more solid, causing absorption on the other. I cannot, however, see how this can take place, for it has already been stated that the vertebræ commence and continue their ossific formation from three distinct places, the one in the centre of the body, the other two on each side of the posterior part of the vertebra. The one in the centre forms the support of the spine, and is of equal structure in every part; but if the ossification arose on each side of the body, this might be the cause. This theory rests upon the hypothesis that the body is formed of two separate portions, each gradually advancing towards the other; but it has little place amongst physiological principles. The habit of maintaining the body in an improper position may lead to lateral curvature of the spine, particularly if the mal-posi-

tion be adopted during the growth, and before the bones of the spine have acquired strength sufficient to keep them in a straight position. A young person carrying a child, or even any weight, on the right arm, will induce the spine to yield to the right side: to stand or even to sleep always on the same side, may produce a similar result. The spine will thus become subject to a debilitated state, and in either case will be rendered liable to morbid affection.

It is hurtful to keep young people too long in one position, or to permit them to sit on a form without support to the back, by which the whole weight of the upper part of the body rests upon the spine.

Sprains of the back will sometimes produce lateral curvature of the spine, on account of the pain caused by the injury inducing the patient to incline the trunk so as to obtain relief. In such cases, rest, and the removal of all inflammatory disposition, will be likely to restore the spine to its natural shape, provided the deformity has not continued too long a period.

Rheumatic inflammation may take its seat in the joints, membranes, and muscles of the spine, and

lead to distortions by causing the patient to keep a position that may be easy, but unnatural. The treatment of such cases should be first directed to the relief of the primary cause of the mal-position, and then to the restoration of the spine to its normal state, by the action of the muscles, by extension, or other mechanical means which the skill and discretion of the surgeon will point out. If the rheumatic inflammation has existed for a long time, so as to have caused an absorption of the cartilages of the articulating surfaces of the oblique processes, and of the synovial capsules, anchylosis alone can be expected, and then the restoration of the spine to its natural shape would be the first object, provided no bony union had previously taken place; for in that case any attempt to restore the spine to a straight or proper position would increase the mischief, and retard the recovery of the patient.

Syphilis may be one of the causes of lateral curvature of the spine, not only in the adult, but in the early age of infancy, for the disease may be imparted to the child by the parent; and very many cases have come under my consideration, not where the spine, but where the skin, and even other parts of the body, were the seats of the complaint,

and this has been discovered even very soon after birth. If such cases were neglected, it is more than probable that the system generally would be influenced by the disease, and the spine or other parts of the body become affected, the spine being slow in its formation, and consequently weaker, and more liable to morbid affection.

Children may have distorted spine at the time of birth, as well as other malformations, as hare-lip, fissures in the palate, club-foot, marks on the skin, &c.; and it has been supposed that if the spine be curved or distorted at birth, the deformity is incapable of remedy. I do not agree in this supposition, but am of opinion, that as all the other malformations are remediable by operation or otherwise, distortions of the spine are equally so. I admit that if they are neglected for too long a time, and the bones become formed, the difficulty is insurmountable; but if, as soon as the child becomes sufficiently strong, and before the spine has been allowed to acquire too much firmness, some proper mechanical means be employed, I have little hesitation in expressing my conviction that very considerable benefit may be afforded, and probably a perfect cure effected.

To attempt here to lay down any plan of treat-

ment respecting congenital deformity of the back, would be ludicrous. It will be seen in this treatise that various and different modes are recommended in the several cases that may present themselves, and that a plan useful in one case might be hurtful in another. The treatment, therefore, in every case must depend upon the nature of the malformation; and the practitioner will do well to investigate thoroughly the distinct character of the deformity, before he venture to use any means for its removal.

Curvature of the spine arising from debility, coming on after the infantile complaints have too rapidly succeeded each other, such as smallpox, measles, scarlet fever, hooping-cough, &c., may assume various forms, either lateral, incurvation, excurvation, or angular projection of the spine, but the one we are now treating of is in a lateral direction. In such cases, much will depend upon the duration of the complaint, whether the deformity be slight or considerable; if the latter be the fact, the constitution should be strengthened by all the means (both medicinal and others,) within our reach, by rest, by the removal of all weight from the spine, and by slight extension. Exercises (hereafter described,) will assist in restoring the spine, and in dilating the

chest by muscular action; and thus respiration and the function of circulation will be carried on with greater benefit to the patient, and strength will be given to the weakened column: when sufficient strength has been gained by this plan, we must carefully proceed to make the most of this advantage. In some cases the spinal supporter will be of service; in others, friction and the free use of the muscles of the spine will be sufficient to restore the natural shape.

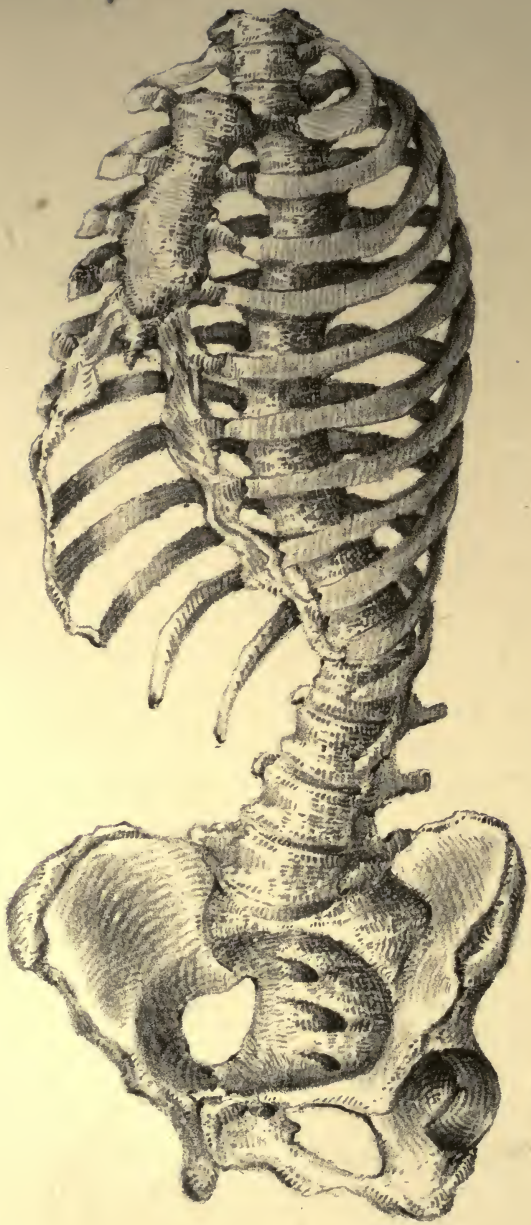
Spinal deformity will occasionally arise from rickets; and this disease in most cases may be easily distinguished from others as a producing cause, inasmuch as some of the other bones, besides the spine, will participate in the complaint, and will be observed to be bent and deformed, as the bones of the leg, the pelvis, and those of the arms. The weight of the body should in such cases be taken from the spine; and some of the exercises in the recumbent position hereafter recommended might be of service, in producing strength of the muscles and of the bones, by increasing the circulating powers. The bones being soft, can be more easily modelled into their proper shape by care and strict attention. I have seen numerous cases (some at the present time are under my treatment,) where improvement is

gradually taking place by the application of splints, rollers, and the exhibition of proper medicine. Instruments I do not recommend, as they cannot be properly regulated according to the growth of the child, and are liable to do mischief around the trunk, by causing pressure against the bones of the pelvis, and consequent contraction of that cavity. Extension may be employed in a very moderate degree.

Should the cavity of the thorax be already contracted, much may be gained by employing these exercises, which if persevered in, will increase that cavity. If the pelvis be contracted, exercise of those muscles that pass from the bones of that cavity to the lower extremities, may also be of service in increasing the size of the pelvis.

Lateral curvature of the spine may take its origin either in the dorsal or in the lumbar vertebræ, and at first be almost imperceptible; but as it increases, the attention is directed to a growing out of the right shoulder, or projection of the hip, or a fullness of the breast on the left side; indeed some cases are on record where the patient had been treated for an enlargement of the breast, whereas the seat of the complaint was in the

spinal column. If the curve commences in the lumbar vertebræ, it is not so easily discoverable as when it takes its origin in the dorsal vertebræ between the blade-bones, inasmuch as the muscles are larger, and cover more of the bones in the one situation than in the other. When the curve commences in the dorsal vertebræ, a concavity is generally formed on the left side, the convexity approaching the right blade-bone, making it project both backwards and sideways: a second curve is soon afterwards gradually formed in the reversed direction in the lumbar vertebræ, so that the convexity is on the left side, and then the curve assumes the shape of the letter S formed thus . Should the curvature be slight, the figure of the spine may be more properly compared to an italic *f* reversed. If the commencement of the curve be in the lumbar vertebræ, the spine will soon assume this form. I allude to the shape of the spine when examined by tracing the spinous processes from above to the lower part of the vertebræ. The curve is much greater at the anterior part of the spine, so that the mischief may progress for some time before it is discovered. To enable the reader the better to understand the form which the spine assumes in this state of the



On Zinc from Nature by H.F. Coley.

affection, I would draw his attention to Plate V.* It will be seen on examination, that the curvature here represented was produced by tight lacing; the contracted ribs at the lower part of the chest, the lengthened thorax, the shape of the upper part of it, all clearly point out this as the cause of the curvature.

It has been before stated that the curve is much greater when viewed on the anterior part of the spine of any anatomical preparation; and knowing that the bodies of the vertebræ are the principal parts affected, we need not wonder at this. In the living body the complaint may for some time escape our observation, because it is hidden from our view by the parts which cover it; and it is only when the spinous processes become deranged that we are able to detect the complaint. We must not therefore expect to find in all cases that early improvement in the straightness of the back, which may follow a steady perseverance in the prescribed remedy.

In the treatment of such a case, where the shape of the chest and the spine is as seen in Plate V., much will be gained by exercises in the recumbent position,—much improvement looked for

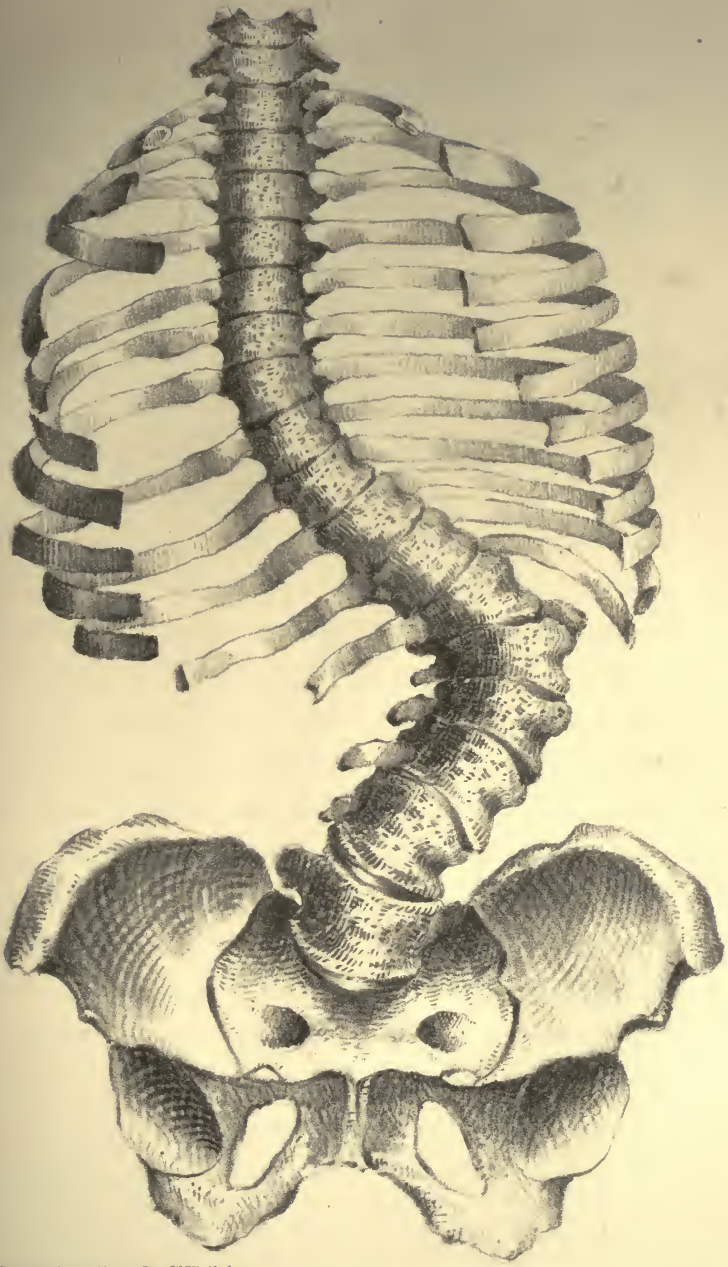
* The preparation from which this Plate is taken is in the Museum of the Middlesex Hospital.

by putting into action the muscles which elevate the ribs; those for instance that are attached to the bones of the arms, as the pectoralis major and minor, the serratus magnus anticus, the latissimus dorsi, &c. For this purpose the arms should be elevated slightly over the head and above the chest. The exercises will be pointed out under the head of treatment of lateral curvature.

Lateral curvature of the spine, although slight at first, will most probably increase if neglected, until it assumes a much greater degree of deformity. The complaint, therefore, should not be allowed to continue unchecked or uncontrolled, but immediately placed under some treatment, although it may not tend completely to cure the complaint.

The recumbent position, for example, will, by taking off the weight of the head and arms from the spine, prevent the increase of the curvature, and will give the spine some degree of strength by keeping it in a horizontal position, and relieving it from a burden which it is incapable of supporting. This position, no doubt, will have the advantage already mentioned, but will not alone cure the deformity.

Lateral curvature allowed to increase, or left to



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itself, will in some cases more rapidly progress than in others ; and of course this will depend in a great measure upon the constitutional state of the patient. In a debilitated habit, the complaint will more speedily require attention than when the body is in a stronger state.

The curve, as before observed, may take its commencement either in the dorsal or lumbar vertebræ, but whichever may be the primary sèat of the disease, a double curve is ultimately produced. The one may, however, be greater than the other ; and I believe the greatest curve will be in the primary seat of the complaint. The accompanying plate (Plate VI.*) will illustrate this remark : the curve in the lumbar vertebræ will be observed to be much greater than that in the dorsal; and no doubt in this case the curve in the bones of the former was the first to make its appearance in the spine.

The difference between these two cases will be very manifest to the reader by comparing the present with the preceding plate. The form of the chest should be noticed. In Plate V. it will be found to be long and contracted, in Plate VI. to be large and much more dilated; so that

* This also is from a preparation in the Museum of the Middlesex Hospital.

the viscera in the thorax had a larger space for the performance of their functions. I would refer the reader to Plate VII. to observe the extent to which lateral curvature may ultimately arrive.

The symptoms vary considerably in cases of lateral curvature; some patients complaining of pain at the pit of the stomach, others of pain in the side; some of pain at one particular part of the abdomen, which might be covered by the palm of the hand, and which remains for a short time, and is then felt by the patient at another part of the body. Some complain of pain in the chest, headache, weakness in the back, loss of appetite, lassitude, disinclination to take exercise; while in other cases the patient may first discover the hip growing out on one side, or the shoulder projecting, or the bosom on the left side being larger than the other. The symptoms vary considerably, and when allowed to continue, or without medical treatment, palsy of one or more of the extremities may take place. The functions necessary to a healthy state of the female constitution are in most cases of diseased spine suspended. Hence it follows that the sufferings of patients are very dissimilar, although the cause be the same; and these gradually diminish as the spine recovers its proper

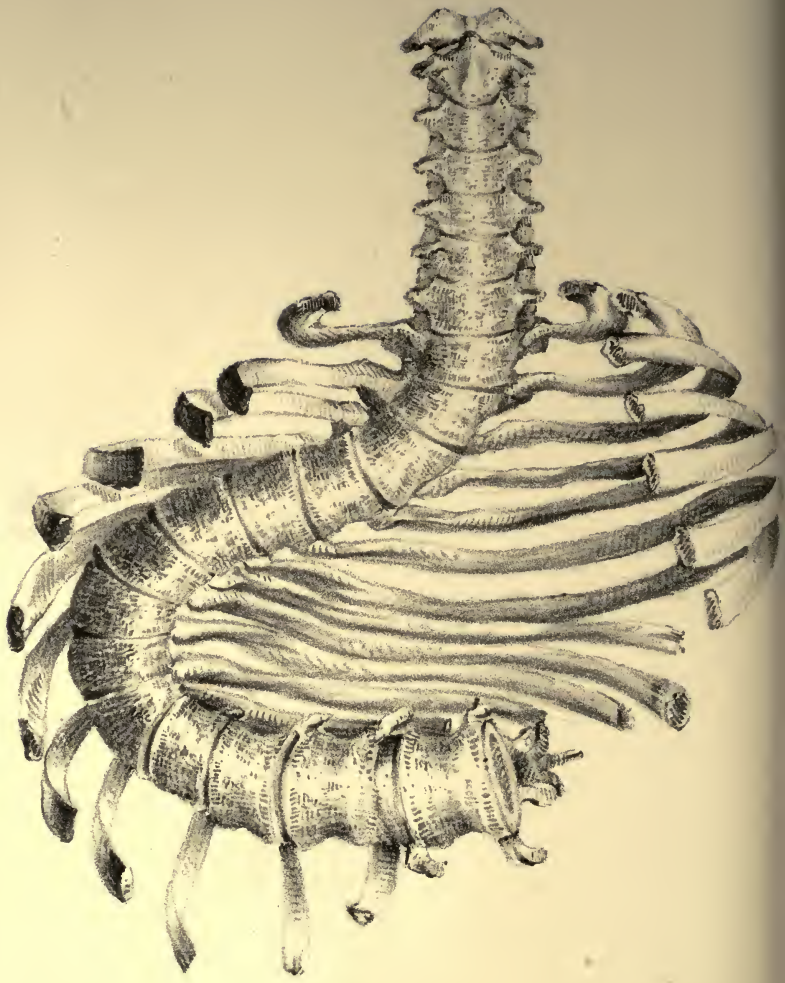
form. The several symptoms enumerated may be regarded as resulting from the unnatural shape of the spine, and can only be removed by reducing that part of the frame to a state of health and vigour. The attention, therefore, of the practitioner should be directed to this important end, and not so much to regard the symptoms as the restoration of the natural figure. The plans to be followed for this purpose are several, and the selection of a proper remedy must entirely depend upon the cause and nature of the complaint, and will be hereafter described in this work.

Lateral curvature of the spine may result from caries of the vertebræ, the sides of the bodies of the bones being the seat of the disease; and this also may result from scrofulous, or other constitutional diseases. Such cases of lateral curvature are rare, and when they arise, the curve more rapidly increases than from other causes. As regards the treatment of such cases, all the observations with respect to angular projection of the spine will equally apply to the disease when attacking the sides of the bodies of the vertebræ, instead of the anterior part. I am well aware that the existence of the disease in this form is denied by some surgeons, but I have seen two or three cases of post

mortem examination which justify me in asserting that this is one of the causes of lateral curvature.

Extension in such a case must be used very cautiously, or it may increase the disease. Much must depend upon its duration, and upon the symptoms that present themselves: palsy will frequently coexist with it. The constant recumbent position, with very slight extension, may in a moderate time produce beneficial effects. The patient must not be allowed to use any exercise that will in the least degree excite the action of the vertebræ, for anchylosis is to be looked to as the cure of this affection; and the patient must be prevented from leaving the recumbent position too soon, lest by motion those adhesions may be separated which nature had formed for the cure of the disease.

Curvature of the spine occasionally appears in another form, arising from two different causes, and producing two curves; the first being in a lateral direction, and then running backwards. There is much difficulty in detecting the manner in which the bones grow out so as to occasion this deformity. The one cause of this affection may be caries of vertebræ, either scrofulous or otherwise constitutional; the other cause a debilitated state



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of the vertebral column, from the want of a natural development of the bones of the spine.

When the curve takes two different directions, the nature of the affection is not so easily ascertained. The ribs in some cases are propelled backwards by the spine forcing them to take that direction. The peculiarities of this form of the disease I will describe under the title of

COMPLICATED CURVATURE OF THE SPINE.

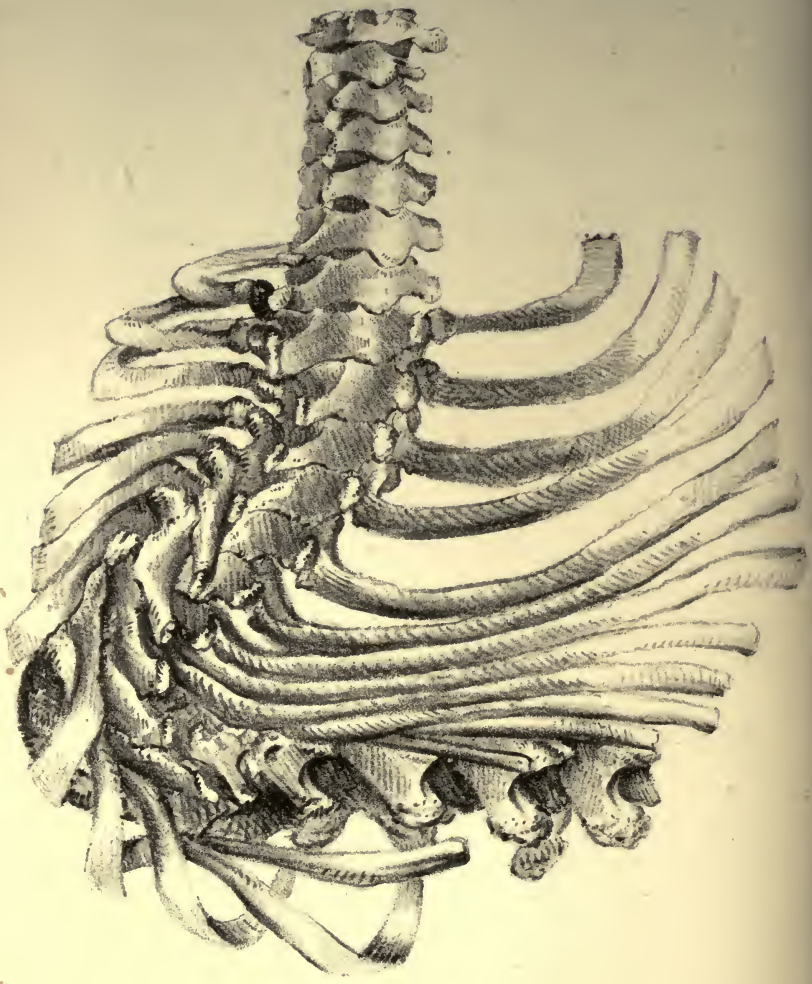
Plate VII.* will illustrate this deformity. The cause of the extensive curve seen in this plate was a debilitated state of the vertebral column. There is no disease, that is to say, no caries of the vertebræ to be discovered. An anterior view of this case is here given; but it does not afford a very clear idea of the direction in which the ribs are propelled out of their natural position, and therefore another view of the same preparation may be examined in Plate VIII.

This deformity may be said to grow out of lateral curvature in the first instance, and then it inclines obliquely backwards, so that the ribs are propelled backwards behind the lateral and some-

* This is likewise from a preparation in the Museum of the Middlesex Hospital.

what fore part of the bodies of the spine. Thus looking at the case, without making a very careful examination of the spine, the situation of the ribs, and the projection of the sternum on its lateral part, it might at first be supposed that the deformity resulted from a diseased state, or caries of the vertebræ; whereas, by strictly observing the situation of the ribs, the inability of clearly tracing the spinous processes of each vertebra, the ribs being longer on the one side than on the opposite, and by a clear knowledge of the anatomical structure of the chest, we shall find out the nature of the curvature; and there can be no doubt that many supposed cases of angular projection of the spine cured by the means recommended by those who profess to cure all cases by extension and the recumbent position, have been cases of the kind now under consideration, and not of angular projection.

Although the curve of the spine is so extensive, there may be little deformity of the chest; and a case is now under my care where the spine has acquired the shape represented in Plate VIII.; but on requesting the patient to lie on his back, there can be observed but little variation in the form of the anterior part of the chest, although at the posterior



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part, particularly on the right side, the projection is very prominent: this fact is worthy of record. In other cases, however, the deformity of the chest may be very considerable, when of course the sufferings of the patient are more severe.

Plate VIII. shows the situation of the vertebræ, the ribs passing behind the spine, and the curvature being of very considerable extent. In such cases, when the age of the patient will permit, a cure may be commenced by extension of the spine whilst in the facial recumbent position, with certain exercises in the opposite position: the muscles of the chest may be daily exercised before the extension is employed. Care should be taken at first to employ the extension gradually; the spine should be rubbed daily, and the patient constantly recline upon a couch, which I shall presently describe, with the upper and lower parts of the spine drawn from each other, and thus kept moderately extended by the aid of springs. Should this treatment at first be more than the patient can bear, it may be daily used but for a short time, and increased gradually. In these cases caustic issues, counter-irritation, blisters, &c. will not prove of the least service, but on the contrary do harm, and increase the pain, the sufferings, and the distress

of the patient. When the spine, by such gradual extension and other means as advised, has been rendered sufficiently straight, the spinal supporter may be applied with benefit.

These means may afterwards be used only every second or third day, the spinal supporter being worn by the patient in the intermediate periods. After carefully continuing this plan for some time, and watching the symptoms and the general health of the patient, the sitting posture may be tried, for a short time at first, and followed by carriage exercise: or a walk may be taken round the apartment, or even in the open air. The surgeon should most carefully watch the progress of this treatment, and vary the means as occasion requires. Should the case not improve so rapidly as it did in the recumbent position, that of course ought to be immediately resumed, with extension in both the facial and dorsal recumbent position.

Complicated curvature of the spine may arise from caries of the bones in two different situations at the same time, the one being in the fore part of the bodies of the vertebræ, the other in their sides. The spine would then sink down in front, and on the side where the caries exist. Attention to the cause of the deformity is of the greatest import-

ance, for the treatment of the two cases must be of a diametrically opposite character. Scrofula may be the primary cause of complicated curvature of the spine, and in such a case the deformity admits of remedy by judicious medicinal treatment, aided by mechanical means. Issues are of no service, as I shall hereafter point out when I speak more fully of scrofulous caries of the vertebræ. Mechanical aid, as I before said, will do much to support the spine, and prevent the patient being obliged constantly to keep the recumbent position.

When complicated curvature of the spine arises from caries not of a scrofulous character, benefit will often result from counter-irritation: issues may be absolutely necessary, blisters may prove beneficial, the constant recumbent position must be strictly kept, and medicinal aid will accelerate the progress of the cure.

I now proceed to treat of

SECONDARY LATERAL CURVATURE OF THE SPINE,

which may result from some other disease; for instance, from diseased hip, knee, ancle, &c.

The spine, then, becomes curved by the abnormal condition of some other part of the body. A disease

of the hip-joint for instance may terminate in the removal of the head of the femur from its natural cavity, and produce a shortening of the leg. The patient will at first walk very lame, but by degrees become less so, for the spine will become curved, to accommodate the shortened limb. In this case nature alters the spine to remove the inconvenience arising from the disease of another part of the body. The surgeon should ascertain whether the hip is the seat of the disease, and if so, must prevent the spine from becoming affected, by the patient wearing a high-heeled boot, or some instrument, to make the legs of equal length, thus keeping the spine in its natural state. Should the curve, however, have been formed through neglect, the case may be treated according to the plans hereafter recommended; but when the cure is accomplished, the above means should be employed to prevent the spine being again affected.

Disease of the knee or ancle may ultimately occasion a curve of the spine, and will require a similar plan of treatment.

Lateral curvature of the spine may sometimes take place after, and be a continuation of, an affection of the hip-joint or ancle, which disease ceasing

in its primary seat, leaving the joint free from any affection, attaches itself to the spine; and this observation applies more particularly to cases of a scrofulous character. The treatment must depend entirely upon the form of the disease affecting the vertebral column, and the various symptoms present.

When the spine is examined, the medical practitioner should also carefully examine other parts of the body, in order to ascertain the character of the diseased spine, whether it be primary or secondary; for, as I have before stated, lateral curvature of the spine may be the consequence of disease in other parts of the body. But I must also add, as an additional motive for the utmost vigilance on the part of the surgeon, that the knee may be contracted, the ancle may have lost its power, or there may be a deficiency in the natural arch of one foot, or one limb may be shorter than the other: but supposing that the spine has been examined, and found to be curved, and that one of the legs should be smaller and shorter than the other, the primary disease may still have been in the back; for the spine having been curved, the nerves, as they make their exit from between the vertebræ, may be compressed, and therefore the growth of the extremity will not

continue. In such a case attention should be immediately directed to cure the curvature, and to take off the pressure from the nerves; for otherwise the growth of one leg will not keep pace with that of the other, and there will be no comparison between them, as regards either size or strength. I remember to have seen a case of a young person, twenty-five years of age, with lateral curvature, where one leg was only half the length of the other. The case had been neglected; the limb on one side had grown, the other had lost its action, and had been as it were blighted. The patient was doomed to walk on crutches for the rest of his life; whereas, if his case had not been neglected, and the spine had been restored to the straight position, the pressure would have been taken from the nerves, and there would have been a chance of preserving the use of the limb.

There are works on affections of the spine, whose authors lay down and recommend *one* general plan of treatment, whatever be the cause of the complaint; whether scrofula, general debility, caries, or a softening of the bone,—whether the curvature be lateral, or in any other direction,—even angular projection is not exempted,—but one mode of cure is to be followed.

I cannot think it necessary to dwell at length on the absurdity of such advice: it must be manifest to persons of any scientific attainment, nay, to those possessing even common sense, that as diseases vary in their cause and character, so must their treatment vary. Some have strongly objected to the use of instruments, some to the constant recumbent position, some to exercise, some to the use of the inclined plane, some to the extension of the spine; and these may and must be condemned when advanced as an universal remedy in all cases of affection of the spine. The plan of treatment must differ materially in almost every case of distorted spine, just as in other cases where the same disease may require different remedies in different patients. Thus, supposing the case to be fever, the one patient a strong robust person, the other a weak and debilitated constitution, both of the same age, the same plan of treatment could scarcely be expected to lead to the same termination. Every circumstance, therefore, must be duly considered before we commence a plan of treatment; and in pursuing it we must carefully watch the effect. Doubtless in one case of spinal curvature instruments may be useful, in another, injurious; so with regard to all the other remedies which I have mentioned. Their fitness

and application must be left to the judgment of the practitioner, whom it has been my endeavour to impress with the necessity of a very careful and accurate examination of the causes of disease, before he enters upon the cure.

It follows that circumstances may require a change in the treatment. If the cause of the curvature was found to be the use of tight-laced stays, could any plan of treatment be of service while the patient was allowed to wear them? In such case they must be left off before any course of treatment can be adopted with hope of success, and exercise would be of the utmost service; but the patient must undergo such exercise when the weight of the body is removed from off the spine, otherwise the deformity would be increased instead of diminished; and to supply this exercise, the spine being quiescent, is one great object of the couch which I have constructed, and which I shall presently explain more particularly to my readers.

I shall conclude this part of my treatise by recommending strict attention to the increase of the strength of the patient, and to the promotion of the general health of the body by the due discharge of all its natural functions. The heat of the apartment should be regulated, and much

advantage may be gained by ordering the skin to be sponged with water, or vinegar and water, or a solution of bay-salt and water, or sea-water when it can be procured. Friction would probably improve the general circulation, and strengthen the muscular power. Tonic medicine may be of use, and good and proper diet is indispensable.

TREATMENT OF LATERAL CURVATURE OF THE SPINE.

VARIOUS plans have been recommended to remedy curvature of the spine, and the author of each has pertinaciously adhered to his own, treating all cases indiscriminately, and not looking, as should be done, to the cause of the curvature, and whether it be in a lateral or any other direction. Extension, rest, counter-irritation, instruments, pressure, exercise, &c. have each been recommended and used by their own advocates; but in the nineteenth century, when science has so greatly improved, and is daily making such rapid progress, fallacious reasonings must give way to practical experience; and I trust that I shall be enabled to make manifest the absurdity and unscientific mode of treatment too often applied to the subject under consideration, and that no dependence can safely be placed on the principles and practice to which I have referred.

But while I thus expose the ignorance of the empiric, let it not be supposed I condemn the works of those scientific men who have devoted their attention to the subject, and to whom the profession and the public are much indebted for useful and scientific observations on the affections and diseases of the spine. I submit the names of Sir B. Brodie, Earle, Shaw, Bradly, Bampfield, Thompson, and others; but I am not aware that these gentlemen have ventured to introduce or adopt any single mode or plan of treatment as applicable to all cases. Sir B. Brodie's observations on caries of the spine are well entitled to the attention of every practitioner. Earle's are scientific, and the means recommended by him useful, mechanical, and ingenious. The work of my departed friend Mr. John Shaw, will be found useful to all those who are desirous of better acquaintance with this subject: his plan of treatment was employed while I held the office of house-surgeon to the Middlesex Hospital, in several cases, with beneficial result. Bradly's observations are worthy of attention. Bampfield's work is interesting and instructive. Thompson's remarks may be read with attention, and his treatment may prove useful and advantageous *in some cases.*

All the remarks of those who have written upon affections of the spine I have read with attention and deliberation; and from personal experience of very nearly twenty years, from careful observations, and a thorough acquaintance with the anatomical structure of the spine, I purpose to lay before the profession and the public a plan of treatment which I have found successful in all the cases where it has been adopted; but before I enter into its detail, I deem it necessary to make some observations on the means pursued by other practitioners.

I will notice first the plan followed by the late Dr. Harrison. I had many opportunities of observing that he kept the patient constantly in the recumbent position, producing extension of the spine by fixing the upper part of it, placing around the pelvis a firm belt, which was attached to a windlass at the lower part of the couch, the patient being in the facial recumbent position; and when sufficient extension had been made the Doctor would employ pressure against the spinous and other processes of the vertebræ, keeping up such application of pressure for nearly an hour. The patient's back was rubbed for some time by a nurse

before he used the extension and pressure alluded to. When he found the spine had become sufficiently straight, he had a steel stay made, with a shield to cause pressure upon any projecting part: for example, if the right bladebone and the hip projected, pressure would be made against those parts, and counter-pressure on the projections on the opposite side.

It must be acknowledged that part of this plan was successful to a certain extent in some cases, particularly in lateral curvature arising from a softened state of the bones of the spine; for it appears plain that any part in a weakened state, bending under the weight imposed upon it, would, by removing that weight, be likely to regain its strength, and that nature would exert herself for this purpose. But he did more than this; he was not satisfied with simply taking the weight from the spine, he made such extension as to elongate the spine, and to bring the bones towards a straight line, and then endeavoured to keep it in that improved position. To his plan, however, there are some great and insurmountable objections. To keep the patient constantly in the recumbent position is wrong, inasmuch as it prevents the muscles from undergoing the

slightest degree of action, subjecting the joints, not only of the spine, but of the extremities, to become weak and stiffened. A physician of considerable eminence mentioned to me, whilst engaged in writing on the present subject, that he had been called professionally to see a patient who had been under the treatment of Dr. Harrison for four years, and who had been kept constantly in the recumbent position during the whole of that period. The consequence was, that the want of muscular action had deprived her of the use of her limbs. When an attempt was made to place her in a sitting posture, the joints were found to be stiff and incapable of flexion. She was doomed, therefore, to remain for the rest of her life upon a couch, perfectly helpless, and requiring constant assistance.

Some maintain that the health does not suffer from this constant recumbent position; that on the contrary it improves. But why is this apparent improvement in the health occasionally seen? it is because, as the spine becomes straighter the health appears to improve, as the patient does not suffer from the pain previously complained of. But this is no criterion, as the diminution of pain may be accounted for in very many cases, by the fact

that patients are obliged to lie down in order to relieve the uneasy and painful sensations which they experience in the erect position, by the weight remaining on the weakened spine: but this affords no proof that the health is improved, or that it may not suffer from a long continuance in this position.

The functions so necessary to life and health cannot, according to the dictates of nature, continue in a uniformly healthy state without a moderate and proper degree of exercise. When we are listening attentively in one position to a discourse or a lecture, we occasionally move so as to ease one or other of the muscles that confine or keep us in that situation. A certain quantity of muscular action is necessary for the due performance of several of the functions of the animal economy; and this may be daily seen. If we observe the action of the upper eyelid upon the globe of the eye, we see that it descends momentarily to close the eye, and is speedily again drawn up. This action serves a double purpose, namely, to relax the action of the elevator of the upper eyelid, and also to lubricate the eye. Suppose, then, the eye to be constantly open for want of this action; the result would be, that the air being in perpetual contact with the mem-

brane of the eye, that membrane would become opaque, and the eyesight lost. So if any joint be kept for any considerable length of time in one position, it would become stiff, and the bones at length unite, and the joint be useless. This argument may be adduced by those who keep a patient in the constant recumbent position, to cure curvature of spine, by causing the bones of the spine, or some of them, to unite, and by this means strengthening the support of the body. Such practice may be of the greatest service in certain cases, where the bones are in a *diseased* state, where the vessels and membranes of the bone deposit a gelatinous secretion, where bone is formed which ultimately serves to unite and connect them in such a manner as to support the body; but it cannot be admitted as a proper plan for the cure of lateral curvature, where the bones are *not in a diseased* state.

Dr. Harrison, during the time of employing extension of the spine, was accustomed to make pressure against the spinous and transverse processes, with an instrument flat at its lower part placed against them, and also against the oblique processes commencing at the upper, and gradually passing down the spine to its lower part: the

curve being towards the right, his object was to push the bones towards the left side; and the lower curve being in the opposite direction, he endeavoured to push the bones straight, asking the patient if she did not find the bones yield to the pressure he employed.

There are great objections to this plan of making pressure upon the spine during the time of extension. In the first place, it must be obvious that the spine being pummelled and kneaded for an hour at a time, must run great risk of being injuriously affected, without the probability of gaining any ultimate good. Such pressure must on the contrary produce considerable irritation, by bruising the attachments of the muscles; and by causing their fibres to retract, it will only draw the bones out of their places. Whereas, if the muscles are kept in a quiescent state, and free from action, they would prevent the vertebræ from being displaced. The plan of extension is, I am fully persuaded, of the greatest benefit; but it must be lessened by pressure being simultaneously made upon the spine. It may be said that pressure against the muscles will relax their fibres, but then it ought to be made against the belly of the muscle, and not against their

attachment to the bones; and as to its being of the least use in causing the bones to resume their proper situation, it might just as well be advanced that pressure made against a dislocated bone would restore it to its proper articulating surface, whereas it is the natural action of the muscles that tends to draw the ends of a dislocated limb into their right situation. Pressure against the muscles, particularly against their insertions, must then naturally tend to do harm, as I have before noticed. If Dr. Harrison be right as to the cause of the curvature being a partial luxation of the bones of the spine, (in which hypothesis I cannot acquiesce,) still such pressure must necessarily increase the evil; for instead of keeping the muscles in a state of inaction, it causes them to contract, and consequently produces a shortening of the spine, and thus retards the cure.

In regard to the injury that may result from such pummelling and pressure against the spinous, the transverse, and particularly against the oblique or articulating surfaces of the vertebræ, I may observe, that as the structure of the bones, more particularly the bodies of the vertebræ, is extremely minute, much injury would be done, by producing inflammation in them. Indeed, by employing too much pres-

sure against the oblique processes, (though fortunately for the doctor they are protected by many muscles,) inflammation might be caused in the synovial capsules which connect the bones of the spine with each other, and the irritation produced might bring on inflammation in the sheath of the spinal marrow, or even worse consequences. Suppose the curvature to be dependent upon disease of the sides of the vertebræ *(caries)*, how could pressure and pummelling be of the slightest benefit, where the only chance of recovery would depend upon the bones or their membranes sending out osseous matter to unite them to each other? Such practice will disturb nature's efforts for the restoration of the part which was diseased; but rest and quiescence will assist her in effecting a cure.

The pressure produced by Dr. Harrison's plan of treatment may lead to bad results, even in cases where there is no caries, or disease in the bones; for the pressure and force used may injure the several processes of the bones, nay, may cause a fracture of either the spinous, transverse, or oblique processes; and even admitting that these projections of the bones are strong enough to resist the force applied, the membrane covering them may be bruised and injured to such an extent as

to produce inflammation, which must consequently be kept up or increased by a repetition of the same violence, until at last the bones that were previously in a sound state become diseased. But if the membranes covering the bones escape injury, the ligaments which are in a weak or debilitated state may fall a sacrifice to this treatment. The intervertebral substances, and even the spinal marrow itself, cannot be secure under such application against morbid action.

Since writing these remarks, I have held a conversation with a physician of much experience upon this subject, and he mentioned to me a case where an abscess was produced in the back of the patient, which led down to the spine. It was then discovered that by this plan the bones had become diseased, and were, in fact, in a state of caries. Without adverting to other ill-consequences which may follow the plan under consideration, it is my opinion that no advantage can be gained by it. I was often present when Dr. Harrison was employing this mode of treatment, and to my astonishment heard him exclaiming to his patient, "*There*, that bone has yielded, that has resumed its place: did you not feel it?" Is it consistent with reason and common sense, that such pressure could cause the bones to fall

into their proper situation, even if they had been sub-luxated, as Dr. Harrison supposed? I feel bound, however, to state, that whilst I denounce his plan of treatment, I give him credit for believing that such was the cause of the disease, and that the means he employed were beneficial to his patients; but the anatomist must at once perceive the fallacy of such a doctrine.

In regard to Dr. Harrison's plan of keeping his patient constantly in the recumbent posture, the benefits to be derived from it are that the whole spine, and very numerous muscles attached to it, are kept constantly in a state of rest and inaction; that the weight of the trunk does not press upon any of the bones of the spinal column; and that the whole weight of the head and arms is removed from the spine. So far I speak favourably of the recumbent position; but in all cases where the contrary is practicable, I would rather dispense with constant recumbency, and for the following reason, namely, that the general health of the patient is of the utmost importance, and that the functions of life cannot possibly be carried on properly when the patient is constantly lying on the back, and without exercise. Nature being thus unassisted, the muscles

which beneficially press against the various viscera and other important organs of the body, and excite them to the performance of the functions of secretion, digestion, and sensation, are not brought into action. In many cases the constant recumbent position must of necessity be had recourse to; as when a patient, in consequence of the rapid increase of affection of the spine, loses the use of the limbs, or where the limbs become so weak and debilitated as to be incapable of motion; and such cases are by no means uncommon.

I now advert to Mr. Hare's plan of treatment, namely, extension from the various parts of the body. This may be useful in some cases, but as a general plan for *all* affections of the spine, I disapprove of it. The idea of placing pressure by means of compresses upon the protuberant parts of the trunk, I consider much more likely to do harm than good; for it is not reasonable to expect that the application of pressure to a debilitated part will improve its strength or reduce a projection, which is but a secondary result, caused by curvature of the spine.

The constant recumbent position has already been under discussion, and it is therefore unnecessary for me to bestow more notice on the plan recommended by Mr. Hare.

The French mode of extension is of use in some affections of the spine, particularly in a weakened state of the spinal column; but must prove very hurtful in cases where there is caries of the vertebræ, by breaking down any adhesion which nature might have previously formed in her own defence, to restore the strength of the vertebral column.

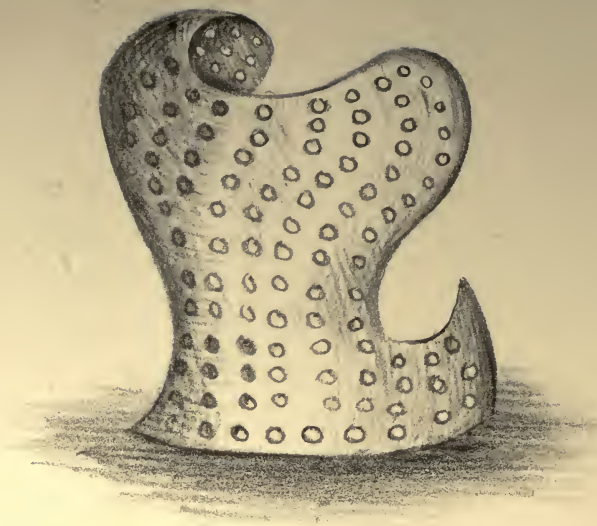
Instruments have for many years been recommended, and I make the following extract from an old work, to show what were the opinions on this subject in days long gone by. It will be observed that my opinions are in many points, as regards the causes of spinal curvature, concurrent with those of the medical practitioner from whose celebrated work I have taken it.

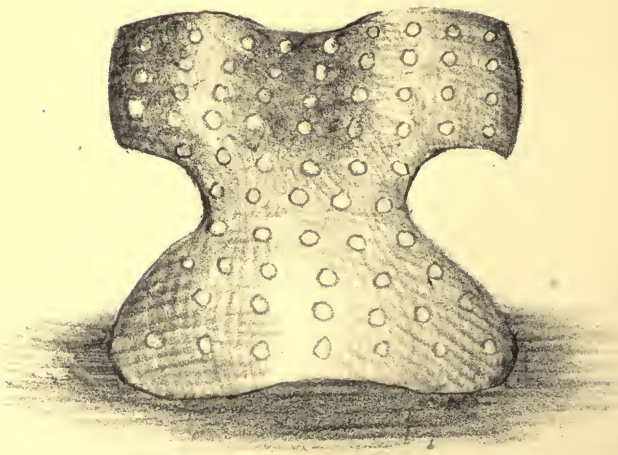
"OF AMENDING THE DEFORMITY OF SUCH AS ARE CROOK-BACKT.

"The bodies of many, especially young maids or "girls, (by reason that they are more moist and "tender than the bodies of boys,) are made crooked "in process of time, especially by the wrenching "aside and crookedness of the backbone. It hath "many causes, that is to say, in the first conforma-"tion in the womb, and afterwards by misfortune,

" as a fall, bruise, or any such like accident, but " especially by the unhandsome and undecent situa- " tion of their bodies when they are young and " tender, either in carrying, sitting, or standing, " (and especially when they are taught to go too " soon,) saluting, sewing, writing, or in doing any " such like thing. In the meanwhile, that I may " not omit the occasion of crookedness, that hap- " pens seldom to the country people, but is much " incident to the inhabitants of great towns and " cities, which is by reason of the straightness and " narrowness of the garments that are worn by " them, *which is occasioned by the folly of mothers,* " *who while they covet to have their young daugh-* " *ters' bodies so small in the middle as may be* " *possible, pluck and draw their bones awry, and* " *make them crooked.* For the ligaments of the " backbone being very tender, soft, and moist at " that age, cannot stay it straight and strongly; " but being pliant, easily permits the spondels to " slip awry inwards, outwards, or sidewise, as they " are thrust or forced.

" The remedy for this deformity is to have breast- " plates of iron, full of holes all over them, whereby " they may be lighter to wear; and they must be " so lined with bombaste that they may hurt no





A. Douglas, del. H.F. Coles, fine.

" place of the body. Every three moneths new " plates must be made for those that are not yet " arrived at their full growth; for otherwise, by the " daily afflux of more matter, they would become " worse. But these plates will do them small good " that are already at their full growth."—*Extract from Ambrose Parey's Work, lib.* 20, *cap.* viii. *page* 529. *London,* 1678.

Plate IX. represents the form of instruments recommended.

The patients who were doomed to wear such rude instruments in those times were much to be pitied; and those in the present day who are recommended to wear instruments of great weight and considerable pressure, are equally the objects of commiseration.

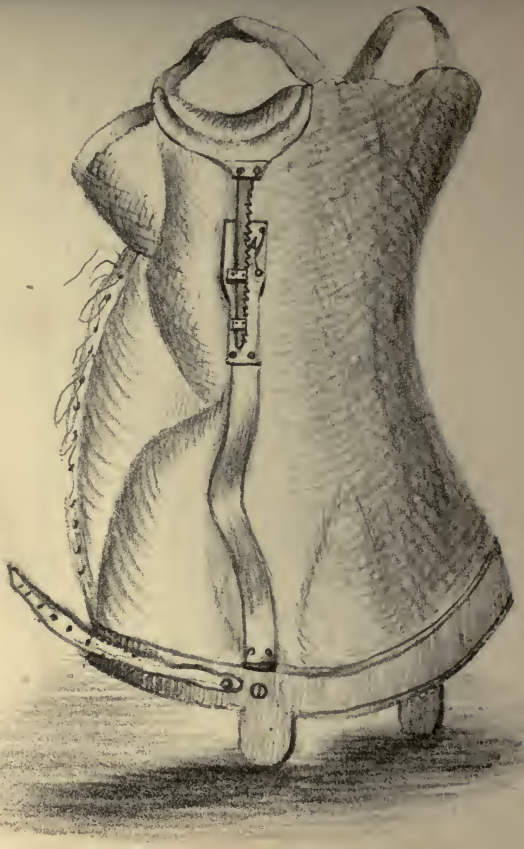
In some cases, particularly in inflammation of the cancellated structure of the bones of the spine and surrounding membranes, instruments may be of service, but they should be made as light as possible, and free from any great pressure. They will prove more useful in cases where the body has completed its growth; for if used at an earlier period, they may retard the full development of that part of the osseous system to which they are applied.

When, therefore, instruments are considered necessary, let them be of light construction. The most useful one I have seen is the spinal supporter made by Mr. Eagland of Coventry street. Plate X.* will enable the reader to understand the form of this instrument; and we cannot overlook the remarkable difference between those recommended in the days of Ambrose Parey and in our own. But I wish it to be distinctly understood, that the mere wearing of such an instrument will not by itself cure or remedy the deformity of the spine; other means must be employed to accomplish this desired effect. There are, however, certain cases, noticed in this treatise under the head "Chronic Inflammation of the Spine and its surrounding Membrane," in which it will be shown that if the vertebræ be kept free from any degree of motion, such instruments will produce in time a removal of all the symptoms, and accomplish a perfect and radical cure.

Gymnastic exercises are strongly advised by some practitioners, in addition to the use of arti-

* Plate X. Fig. 1. A light stay, with steel apparatus for the arms to rest upon.

Fig. 2. Also a light stay, the side-steels being capable of elongation by the contrivance seen at the side.



ficial support, by which means the muscular structure in general will acquire increased power and strength; but if the spinal column be in a weakened or attenuated state, such exercise will, by placing the weight of the various parts of the body upon the spinal column, only increase the curve. If, on the contrary, such exercises be used when the weight of the frame is removed from the spinal column, the greatest benefit will be obtained, as will be hereafter pointed out.

There are several couches which have been recommended by practitioners for the purpose of removing deformity; and the inclined plane, with a hole for the reception of the head, has been esteemed beneficial by some of the ablest physicians and surgeons of the day. Hare has a couch which he recommends. Harrison had one formed after his own plan, with a small windlass, to use extension at the lower part of it. Shaw had an inclined plane, which enabled the patient to exercise the muscular system, and to employ extension during the recumbent position. But objections may be raised to most of the couches that have been heretofore made. The inclined plane has been abandoned by many, as it does not completely remove the whole of the weight from the vertebral column.

The horizontal position is not liable to this objection, and I have therefore employed it in cases where rest was required.

During the period that the spine is in a perfect state of inaction, and freed from all the weight of the various parts of the body, extension may be of much service in restoring its natural straightness; but care should be taken that it be not carried too far, so as to produce mischief instead of benefit. It becomes necessary, therefore, to regulate such extension for the various cases which require it. Harrison carried it to a great extent by firmly binding the body, and using a windlass. Shaw employed extension by the aid of a spring against a portion of the inclined plane; and I have so constructed a couch, that it may be employed when necessary, and extension carried to any degree. I consider that the cases likely to be most benefited by it are those where the deformity is occasioned by tight-lacing, and where the spinal column is in an attenuated state; but to enable the reader to understand the means recommended in such cases, I shall proceed to describe the various parts of the couch represented in the annexed plate.

Plate XI. A side-view of the spinal-couch.

a a. The frame-work.

c d. Two well-stuffed horizontal planes, each acted upon by a spring, so that the two will recede from each other. Thus supposing a patient lying on the couch, extension will be employed both to the upper and lower part of the spine.

e f. The two springs.

g g. Two weights to increase the strength of the springs.

h h. Two straps to fasten the two planes, to prevent them from receding when not in use.

k k. An exercising-frame, with a roller at the upper part.

l l. A frame of iron, to enable *k k* to be lowered either forwards or backwards, according to pleasure.

m m. Two ropes with handles, for a patient, when in the dorsal recumbent position, to hold in each hand.

n. A handle, with a corresponding one on the opposite side, for a patient, when in the facial recumbent position, to hold in each hand.

o. A windlass with a handle, for the purpose of regulating or causing a greater degree of extension to be used by pulling *c* from *d.*

p. The handle.

q. A spring or stay, to prevent the windlass from running back when required to act, which can be used or not, by pressing it either inwards or drawing it outwards.

By the above explanation, it will be seen that independently of extension, one of the purposes of the couch is to enable the patient to use a variety of exercises whilst in the recumbent position, which will tend to dilate the chest and increase the functions of respiration and circulation.

Supposing extension should be considered necessary to restore the spine to a straight direction, any power can be employed on this couch, so as to suit the age and strength of the patient. When the weights are unhooked, the degree of extension is very slight, and adapted to patients of an early age.

The power may be increased by attaching the weights to the springs, and the weights may be made heavier or lighter, as necessity may require; and should a greater power be wanted, the windlass may be used, the patient either lying in the facial or dorsal recumbent position. The time of the extension must be regulated by circumstances. Plate XII. fig. 1, will point out the first example.

A patient is here seen lying in the dorsal recumbent position, gradual extension of the spine being kept up by the springs and the weights attached to them. The two pieces of the couch upon which the patient is lying are constantly receding from each other. The use of this gradual and moderate extension is to bring the spine towards a straight or natural form. The whole weight of the body is removed from the spinal column, and the extension is used so gradually that no injury can by any possibility occur, nor does the patient suffer the least pain from its use: the spine is thus by degrees ex-

Fig. 1.

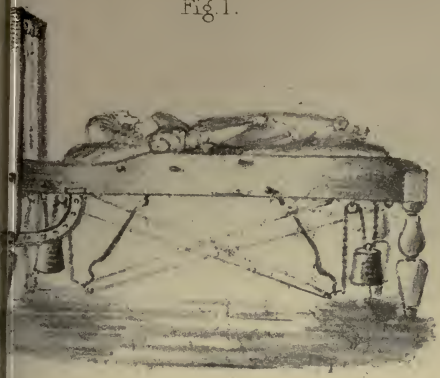


Fig. 2.

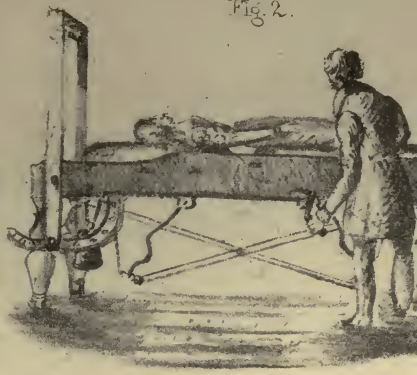


Fig. 3.

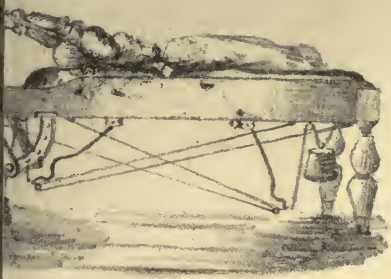


Fig. 4.

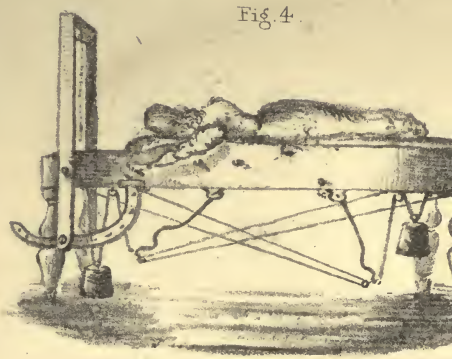


Fig. 5.

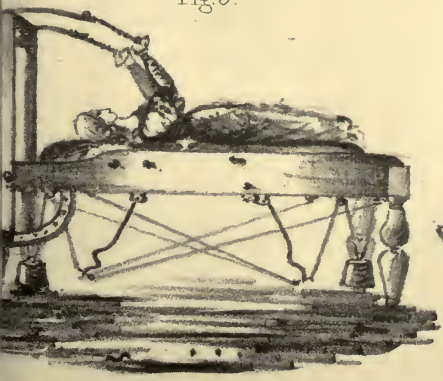
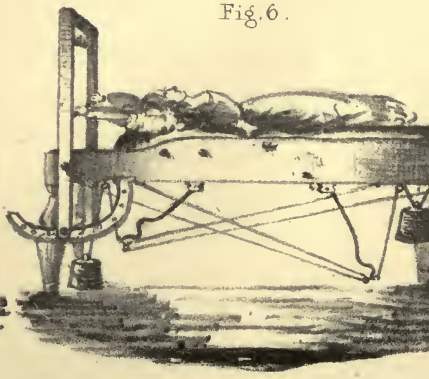


Fig. 6.



Drawn on Stone by H. E. C. J.

tended to a straight position ; and when that is obtained, the deformity dependent upon the curved spine will disappear, and the cure be accomplished.

The time required to gain this desirable end, and the period during which the extension should be daily kept up, must entirely depend upon the nature of the case, the degree of the deformity, and the age and constitution of the patient, and must be regulated by the judgment of the practitioner under whose care the patient is placed; a slight curvature not requiring such great and continued extension to effect a cure as one of a longer standing and more advanced state.

There are some cases where extension is not advisable ; for instance, when the sides of the bones of the vertebral column are in a state of caries, when rest is of essential service. The couch will then be of great use, for the springs that separate the portions of the couch, and produce extension, may be loosened so as to form a horizontal couch.

In cases where the spine has become considerably curved by tight-lacing, and the vertebral column reduced to a weakened state, the employment of extension will prove of the greatest benefit, and as the case may require it in an increased

degree, the windlass may be used. Fig. 2. Plate XII. will enable the reader to understand the mode of using such degrees of increased extension.

The weight of the body resting upon the two pads of the couch, will be sufficient in most cases, without fixing the pelvis to the one pad and the trunk to the other; but if upon trial it proves that they slip away too freely from the body, without effecting the required extension, the trunk may be easily fixed to the upper pad, and the pelvis to the lower one by straps, and then very considerably increased extension may be attained by the windlass: but caution is necessary to guard against mischief. No harm or injury to any part of the spine can occur when the body is only lying upon the couch, and the windlass used; and no cases have as yet come under my observation which have required the attachment of the trunk to the pads.

The benefit of allowing a patient to lie upon the couch during the time the springs are keeping up extension of the spine, must be obvious, for then a power is in action to place the spine in a straight line; the weight of the various parts of the body are removed from the vertebral column, and we induce, by the power of extension, the spine to resume its natural shape. The remark of the

late Dr. Harrison has been of service to me in several cases, particularly where the spine has been allowed to become very deformed. He justly observed, that what had been gained by extension should be carefully maintained, and the spine not allowed to resume its former crooked state. This advice is good, and we shall examine how it is to be carried into effect. Much must necessarily depend upon the case, for if the patient should be in such a debilitated state as to be unable to rise or walk, then of course the recumbent position with extension will answer the purpose; but supposing the patient should have power, and the desire of locomotion, it can be accomplished with artificial aid, by the use of such a support to the spine as will relieve it of all the weight of the various parts of the frame, as has been before noticed, and may be seen by referring to Plate X.

The weight of the spinal supporter which I have recommended is very little more than the weight of a common pair of stays with bones in them. I have had it made weighing only a few ounces, and still it has been sufficient for the required purpose. The patient may wear these stays constantly, except at night; and the weight of the body being removed from the spine, it cannot become more curved, but

will gradually be relieved; while the health of the patients will improve from their not being kept in the constant recumbent position, and the cure accelerated by the aid of exercise upon the couch, to which I shall direct the attention of the reader. After the spine has undergone a proper degree of extension, the side springs of the spinal supporter may be lengthened by the surgeon, so as to preserve all the advantage which has been gained, and this may be required to be done frequently. I have sometimes lengthened them almost every ten days, thus proving what may be gained under such treatment; and the lengthening of the supporter has never been attended with any inconvenience. I have found in some cases of lateral curvature, that extension by means of the windlass once or twice a week, has been sufficient, although in severer cases this has been found necessary every other day. Of course it must depend entirely upon circumstances, and the nature of the case.

Exercise in all cases of lateral curvature, except in that produced by caries of the lateral parts of the vertebræ, is of the utmost importance in accelerating the recovery of the patient; it will also contribute materially to enlarge the thorax,

by the action of the muscles that elevate the ribs, thereby promoting a more healthy state of the spinal column. The following extract from Dr. Andrew Combe's work is well deserving the attention of those who do not attach sufficient importance to bodily exercise, and will not be inappropriately quoted here in illustration of the above remarks.

"The effects of exercise upon the organs em-
" ployed are very remarkable, and useful to be
" known. When any living part is called into
" activity, the process of waste and renovation,
" which are incessantly going on in every part of
" the body, proceed with greater rapidity, and in
" due proportion to each other. At the same time
" the vessels and nerves become excited to higher
" action, and the supply of arterial or nutritive
" blood, and of nervous energy, become greater.
" When the active exercise ceases, the excitement
" thus given to the vital functions subsides, and the
" vessels and nerves return at length to their ori-
" ginal state.

" If the exercise be resumed frequently, at
" moderate intervals, the increased action of the
" blood-vessels and nerves becomes more perma-
" nent, and does not sink to the same low degree as

" formerly; NUTRITION *rather exceeds waste, and* " *the part* GAINS *consequently in size, vigour, and* " *activity.* But if the exercise be resumed too " often, or be carried too far, so as to fatigue and " exhaust the vital powers of the part, the result " becomes reversed: *waste* then exceeds *nutri-* " *tion,* and a loss of volume and of power takes " place, accompanied with a painful sense of ex- " haustion and fatigue. When, on the other hand, " exercise is altogether refrained from, the vital " functions decay from the want of their requisite " stimulus; little blood is sent to the part, and " nutrition and strength fail in equal proportion." —*Combe's Principles of Physiology,* p. 148.

I hardly think these observations require comment; they most forcibly point out the advantage of proper and judicious exercise; they caution us against its immoderate use, and warn us most emphatically against the evils that must result from a total abstinence from this vital function, by which nutrition and strength are alike impaired. It is on this principle I deprecate the practice of *constantly* keeping the patient in the recumbent position.

The different exercises employed should be so adapted, that the whole weight of the body be removed from the spinal column, for no perma-

nent relief can be effected while pressure is allowed to remain on the debilitated part. I have suggested and followed a variety of plans, to afford the body a sufficient quantity of exercise while the patient is in the recumbent position, many of which may be used with considerable benefit. Plate XII. fig. 3. will illustrate one of these exercises.

A figure is here seen lying upon the couch, with a handle attached to a rope in each hand. The patient is placed in the dorsal recumbent position, and draws the body up by pulling the ropes; this action acting on the springs beneath, causes the pads on which the patient is lying to be drawn down, and *vice versa* when the ropes are loosened; thus exciting and putting into motion a variety of muscles attached to the spine, ribs, &c. This exercise, independent of strengthening the various parts called into action, has another very important result, that of producing an enlargement of the chest, a circumstance of weighty import, as I have shown when treating of the pernicious effects of tight lacing, and which will greatly improve the functions of respiration and circulation, and consequently the general health.

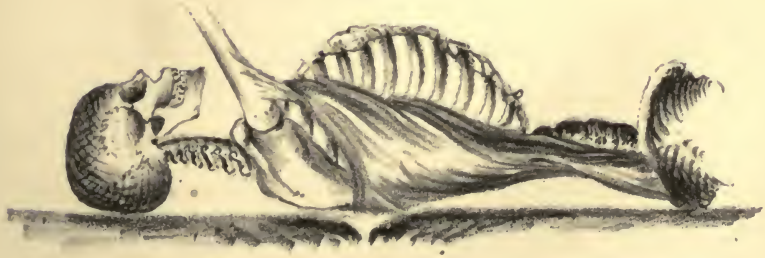
The enlargement of the chest, which must

result from the muscles of the ribs being brought into action, and raising the sternum, admits a larger quantity of air to the lungs, by which respiration is improved, and the blood receiving a larger portion of oxygen, thus becomes more capable of nourishing the minuter parts of the animal structure.

The muscular elevation of the ribs tends also to improve the natural shape by straightening the spine; so that exercise in the recumbent position must be considered as one of the means by which the restoration of the trunk to its proper shape is to be effected, and is well adapted to increase the general health. I deem this to be a most important feature in the treatment of lateral curvature, and have devoted much attention to its application. Plate XIII. fig. 1. will greatly assist my explanation. It represents a skeleton figure stretched on the pads of the couch, with the arms elevated as if using the exercises recommended and explained in the last illustration. The *pectoralis major (a)* muscle is brought into action by the arms being raised, while the ribs and sternum are drawn outwards so as to enlarge the cavity of the chest. The *serratus magnus anticus (b)* muscle is also seen in action, caused by the elevation of the arm; and by its tending to draw up the ribs, assists in enlarging

Fig. 1.

Fig. 2.



From Nature & on Zinc by H.F. Coley.

the thorax. There are other muscles that will aid us in accomplishing this object, one of which is the *latissimus dorsi*. See Plate XIII. fig. 2.

A similar skeleton figure is here represented. As the *latissimus dorsi (a)* takes an attachment from the last three ribs, as well as from the spine, its action must tend to draw the ribs out, whereby the abdominal cavity is increased in size, and any pressure that previously existed against the viscera becomes removed, allowing the digestive organs more room to perform their functions, the general health to be benefited, and the strength increased.

To these three muscles may be added the *pectoralis minor*, and several others, as aiding in the restoration of the trunk to its normal condition; indeed, all the numerous muscles attached to the spine assist, by being brought into play, in giving the spine a variety of motions, which tend to improve its structure, accelerate its restoration to health, and enable it to regain a greater solidity.

Much advantage will be obtained by varying the exercises, both with regard to the improvement of the body, and the amusement of the patient's mind, a thing not to be overlooked; for a new exercise will be more readily performed by them,

whilst the change will bring other muscles and parts into active exercise that have hitherto been almost inactive, and those that have been most exerted will be allowed a partial repose. This process will bring the various parts of the spine successively into play, and prove the best means of ensuring an ultimate cure.

The practitioner must be careful that these exercises are not carried to excess, otherwise, as we have before seen, mischief must result. It is not therefore prudent to leave the performance of the various exercises which the couch affords, to the judgment of the patients or their relatives; they should *always* be regulated by the medical attendant, as a speedy recovery must in a great measure depend on their judicious application and arrangement.

Another exercise may be followed with considerable advantage in dilating the chest: it is one recommended by the late Mr. Shaw. The patients being in the facial recumbent position, (see Plate XII. fig. 4.) take hold of the handles on each side of the couch; and then pull themselves up, when the spring attached to the pads will draw the body down again. The duration of this exercise must be left to the discretion of the practitioner.

Another mode of exercise may be used, and will materially assist in accelerating and inducing the spine to become straight. The patient, lying in the dorsal recumbent position, takes hold of two handles hanging from a rope fastened to two lance-wood shafts, fixed to the exercising frame, which belongs to the couch, Plate XII. fig. 5. The patient may pull each handle alternately, which will act upon the pliancy of the lance-wood shafts; and by this means a new mode of exercise may be adopted for any required time.

The use of changing the exercise will be apparent to the anatomist, inasmuch as by a variety of motions other smaller muscles not previously used will be brought into a state of activity, and sure to strengthen the spine in the power of supporting the trunk. Too much attention, therefore, cannot be paid to this subject. A patient may lie in the dorsal recumbent position, (Plate XII. fig. 6,) taking hold of two handles attached to each side of the exercising frame, at the head of the patient, and draw the frame on which the body inclines upwards, when by the action of the spring the frame will immediately return to its original place. This exercise in many cases will be of much benefit.

The action of sawing, ringing bells, or any

similar motion performed with the arms raised over the head, will tend greatly to dilate the chest, strengthen the spinal column, and prove beneficial to the general health; and this can be easily accomplished by attaching the half of a skipping-rope to the ring acted upon by the lower pully, and by the patient taking hold of the handle and pulling it forwards: the spring will immediately draw it back again, thus affording salutary exercise to certain muscles of the chest. (Plate XIV. fig. 1.) This exercise will also call into action numerous muscles of the spine and superior extremities, and I have recommended it in several cases with beneficial results. I have produced a change in this mode of exercise, by attaching the middle of a skipping-rope to the ring, and placing the ends in the hands of the patient; both arms are then at a greater distance from the chest, which will tend to enlarge the dimensions of that cavity.

There are many other exercises that can be performed by the aid of the couch already alluded to, but it is presumed that those pointed out will be sufficient to enable the reader to form a tolerably accurate judgment of the means recommended for the relief and cure of this class of spinal affections; but at the same time I consider it necessary to men-

tion one more before quitting this part of my subject.*

The dilatation of the chest has for a long time been considered of the greatest utility, both in regard to the promotion of general health, and the natural development of the figure; and many years since, Mr. Edward Jukes, surgeon, invented a chest dilator,† which requires the patient to sit on a chair, and elevate a kind of wheel over the head; but the objection before mentioned applies to this, namely, that some weight of the body still remains on the spine: to obviate which I have attached a wheel to the exercising frame at the head of the couch, which a patient may turn round whilst lying in the dorsal recumbent position, Plate XIV. fig. 2.‡ This exercise will tend very considerably to in-

* I avail myself of this opportunity of inviting not only the profession, but any who may be interested in this subject, to an inspection, at my residence, of this couch, and the various exercises which I have endeavoured to describe.

† See a plate of the Chest Dilator in Bamfield's Work, page 135.

‡ The author has contrived that the spinal-couch shall also serve every purpose of a fracture-bed, when the pads are to be removed, and a framework substituted.

Plate XIV. Fig. 3. Represents the situation necessary for a fractured knee-pan.

Fig. 4. Represents the situation necessary for a fractured leg,

crease the size of the chest, and be useful in promoting respiration and circulation, thus benefiting the general health, and increasing the solidity and strength of all the component parts of the animal economy. This is a subject of great importance, for it is by the contraction of the chest, the want of proper respiration, and due nourishment of the bones, that lateral curvature so frequently makes its appearance.

The several exercises that have been pointed out will help to re-establish health, by increasing the circulating powers; and the shape of the body will ultimately assume its natural size and form.

It is presumed that sufficient has been said on the subject of exercise in its various forms, and on the advantages to be derived from it, both as regards the health and strength of the patient; more

which being placed higher than the body, lessens the circulation, and consequently the chance of inflammatory action.

Fig. 5. Represents an easy mode of placing a patient in a sitting posture, which after long confinement, is often very difficult, but which may be remedied by this contrivance.

Fig. 6. Represents the situation for a fracture of the thigh, or neck of the thigh-bone; and as the limb too frequently suffers from the contraction of the muscles, causing a shortening of the leg, the part which supports the thigh can by the aid of the windlass be gradually elongated, so as to overcome the contraction of the muscles.

particularly during a time when the spine is relieved from all weight, as exhibited in the plates which represent these various exercises on the couch.

During the time of using the couch, it may be necessary to prescribe tonic or other medicines. Friction, ablution, &c. may be of much service in promoting a cure.

Many men of scientific acquirements hold a very low estimation of all the plans which have been devised to remedy curvature of the spine. They suppose that the disease will continue in spite of any plan of treatment, and baffle the best-directed efforts for its removal; I trust I may convince them of their error.

We all know that disease will necessarily increase and take its course if left uncontrolled, and we daily witness the progress of science in overcoming or mitigating those which a century since were deemed incurable. Surely, then, it savours of scepticism to pronounce that all attempts to cure affections of the spine must be nugatory and of no avail. In the face of these objections I still must affirm, and that too not from theoretical reasoning, but from the result of deep investigation and practical experience, that the plan of treatment I recommend will, if steadily

persevered in, justify our expectations in an ultimate cure of the patients so afflicted. I know and feel that prejudice may for a time blind the eyes of many very scientific men to any innovation, and as a striking proof of this I may mention the opposition that vaccination—the greatest blessing ever yet conferred upon the human race by the medical art,—met with for several years after its introduction. Yet still I trust that those in the profession whose minds are unbiassed, will be induced to follow the plans I propose; nor do I advance more than the truth in asserting, that few, very few indeed will be the cases in which they will not meet with success.

I shall proceed to detail a few of the cases that have come under my treatment, in illustration of this part of my subject, assuming that they will more forcibly bring before the reader the subject matter of the preceding pages, and fully explain some of the plans recommended in cases of lateral curvature of the spine.

CASE.

Emily Tomlinson, aged fifteen years, was admitted into the Middlesex Hospital under my

care, March 25, 1839, with lateral curvature. She stated that about nine months previously she for the first time felt a weakness in her back, and discovered a slight deformity in it; that subsequently the weakness increased, accompanied with a numbness of the legs. At the time of her admission there was great pain and throbbing in the head, weakness in the eyes, and shortness of breath. The back, upon examination, was found to be only slightly curved between the bladebones, and downwards towards the lumbar vertebræ.

The plan of treatment pursued in this case was, the recumbent position for five or six hours daily, moderate exercise in the open air; steel wine was prescribed to be taken three times a day, and the back to be rubbed with a liniment night and morning. For a few days the pains in the head and chest increased, attended with loss of appetite, but she felt great relief when in the erect position with her stays on, as they supported her back. By assiduously following the above treatment, her strength and health gradually improved, and she was soon enabled to leave the hospital, and become an outdoor patient, the pains in the head and chest being removed, and the back much improved

in appearance. She was desired to continue the same plan at home, with the addition of a warm plaster, which I ordered to be constantly kept on the back to afford it some support. She continued this treatment and her attendance for about three months, evidently improving daily. I saw no more of her till the latter end of November, when her sister brought her to my house, requesting me to examine the back, as she was suffering considerably, not having persisted in the treatment after she had ceased her attendance at the hospital, imagining herself quite well. On examining the spine, I found the curve had slightly increased, with a preternatural projection of the lower cervical, and upper dorsal vertebræ. I advised her to resume the same treatment which had before proved so beneficial; she did so, and by my desire called upon me frequently, when I had the satisfaction of seeing the same favourable results, namely, the lateral curvature disappeared, and her strength returned.

In the middle of August in the following year, she again called upon me, complaining of great debility. On carefully examining the back, little trace of lateral curvature could be dis-

covered; but at the lower part of the cervical and upper part of the dorsal vertebræ, there was a projection backwards. The previous treatment having been attended with success, she was advised to continue it, but with an increased duration of the recumbent position daily.

Remarks.

In the above case the spine had only acquired a slight degree of curvature, and might be compared to the one represented in Plate V., with this exception, that there was very little contraction of the chest, so exercises on the couch were not required. We also see that while the lateral curvature yielded to the general treatment, the excurvation caused by the preternatural projection of the lower cervical and upper dorsal vertebræ, only improved by the recumbent position being increased; the necessity of it was therefore duly impressed upon her mind. This case is extremely interesting, as it presents a completely new feature, viz. slight excurvation of the spine with no lateral curvature; and may be considered as one of those which, if neglected, would soon assume a very serious aspect. The girl is still (Nov. 1840.) under

treatment as an outdoor patient of the Hospital.

Should the patient be young,—the curvature slight,—the chest not so contracted as to impede the circulating system or respiration,—the bones not have acquired a soft or debilitated character; or where the deformity has just begun to affect the spine, exercise in the erect position, with the waist free from restriction that the trunk may have complete action, will, if regularly pursued, remove all disposition to disease, and the spine will regain its natural shape and strength. Friction will be useful; and sponging the body daily with bay-salt and water will accelerate the cure.

The mode of using exercise in the erect position is easily accomplished with a pulley, cord, and weight. Let the pulley be fixed in the ceiling; the cord with the weight attached to it is to be passed through this, and a wooden handle about two feet long, and the size of a broomstick, is to be fixed on the other end. This is to be held by the patient with the arms extended forward and upward. The patient is now to pull the weight up till the handle is lowered to a level with the chin, and then allow it to fall again as far

as the arms will reach. This exercise will tend to elongate the spine, from the circumstance of the greater part of the action being above the patient's head. All exercises which require the body to bend forward and downward, should be rejected, as they must prove injurious, by increasing instead of lessening the weight on the vertebral column. Many cases of slight curvature may by these means be arrested in their course; and where the spine shows a predisposition to weakness, they will restore it to its normal condition.

Slight cases of lateral curvature, but more advanced than the former class,—where the chest is only moderately deformed, and the circulating powers but little impeded, or where the bones have only just become soft and debilitated,—may be cured in a short period by the use of exercises upon the couch, together with extension, friction, &c.

CASE.

A young lady twelve years of age, of a weak habit of body, suffering under lateral curvature, with projection of the right shoulder, and enlargement of the left and anterior part of the

chest, consulted me last May. She complained of much pain in the head and back, great weakness, palpitation when going up stairs, and uneasy sensations occasionally during the day. Upon inquiry I found that she had been in the habit of wearing very tight stays. She had just returned from school, where she had been kept to hard study the greater part of the day, using little and insufficient exercise; she complained that she felt always tired, and was glad to lie down at every opportunity. I directed the stays to be made of a proper size, so as to allow the extension of the chest; the back to be rubbed every morning for an hour; that she should recline two hours each day, and visit me twice a week. On these occasions she used the first three exercises already described for half an hour, under my superintendence; after which, extension was employed by the aid of the windlass, which was kept up for a few minutes each time. This plan was regularly followed for three months, by which time the shape of the spine was completely restored, and the chest had resumed its natural size; the pain and other symptoms had also subsided: but for further security, I advised the recumbent position to be continued for some time, at least two hours each day. The patient strictly

attended to my advice, and is now quite recovered.

During the progress of this cure, which was accomplished gradually, not a single unfavourable symptom presented itself. I shall now proceed to detail one that offered similar characteristics, but the primary cause of which could not be traced to tight lacing.

CASE.

Mrs. ——, residing near Russell Square, consulted me respecting her niece, aged thirteen, who was suffering from a weakness in the back, and severe pains in the head. On examining the spine, I found there was lateral curvature, the upper curve inclining towards the right shoulder, causing it to project; the lower in the opposite direction: the chest was contracted, but not to any considerable extent. On undertaking this case, last May, I followed with success the same treatment as noticed in the last, viz. the recumbent position upon the couch, with extension for five minutes at a time, the first three exercises for half an hour, and then extension again. This plan was pursued twice a week for a fortnight, when the patient was mea-

sured, and found to be half an inch taller. The plan was assiduously followed for three months, with visible amendment, the back being always rubbed for one hour daily previous to the exercises and extension. At the expiration of that time the patient's strength had considerably improved, the pains in the head had entirely disappeared, and she was found upon measurement to have increased one inch and a quarter in height. She still continues the same plan of treatment, with every prospect of speedy reestablishment to perfect health.

The next class of lateral curvature which I shall notice, assume a more serious form, and require other means than those detailed in the preceding cases to effect a cure; the strength of the patient not improving sufficiently to prevent the disease from increasing, if the weight of the body be allowed to remain upon the spine. The following case is an illustration.

CASE.

At the latter part of the year 1837, I was consulted respecting Miss ——, aged fifteen. Her symptoms were pains in the head, a teasing cough, and general weakness and languor: there was a

projection of the right shoulder, and of the chest on the left side. Her friends stated that she always stooped forwards, supporting herself by leaning on the left side; that she was restless when asleep, generally lying with her legs drawn upwards. Upon examination I found lateral curvature; the spinous processes of the dorsal vertebræ were drawn on the right side, and those of the lumbar to the left. The scapula on the right side projected at its lower angle, and there was a swelling on the left side of the chest at the union of the ribs with their cartilages. I recommended her to lie on Shaw's inclined plane, and use the exercises he advised; to take steel wine three times a day, and some pills to relieve the cough. She reposed for two hours morning and evening; but under this treatment the case progressed very slowly. I then recommended the spinal supporter. (See Plate X. fig. 1.) This consists of a stay with a steel side-piece fastened round the pelvis, but without compressing it; at the top of each side of the steel upright a semicircular piece of the same metal is attached, well padded, to support the arms, by which means the weight of the head and upper extremities is supported by the instrument, and the spine left in repose. This instrument weighs but a few ounces, and has

nothing unsightly, it being concealed in the stays. The patient easily became accustomed to it, and found so much relief, as to regret that it had not been recommended sooner: shortly after it was applied, it became necessary to elongate the side-springs, to increase the extension. A visible improvement now manifested itself in the condition of the patient; her appetite returned, the back became straighter, and her general health improved: the previous treatment was therefore persisted in, and the spine-reliever constantly worn; the side-springs being occasionally lengthened. But the improvement of this case was far too slowly progressive to meet my wishes and expectations, and I therefore requested the patient might come to my house once a week, that the exercises and extension might be performed in my presence. I adopted this plan in May, 1840, after the patient had been nearly three years under treatment, and in the course of a few months the case improved as rapidly as I could desire. The back was almost straight: a slight irregularity only could be traced, occupying three of the dorsal vertebræ; but this quickly yielded, and the case will soon be completely cured, and the figure restored to its natural state.

Remarks.

From this and other cases that have come under my care, I am persuaded, that to accomplish a speedy and certain cure, the patient must be under the constant superintendence of the medical practitioner, who must strictly observe that the exercises and extension are regularly and effectually persevered in. I can see no difference between cases of this description, and others in which the practitioner is in constant attendance; and I would impress this forcibly on the minds of those medical men who undertake the charge of similar cases, for the most effectual means of cure may be frustrated if their execution is left to others. Many cases might be here detailed in proof of this, which however would only cause an unnecessary digression from our subject.

There are other cases of lateral curvature of a more complicated nature, some of which are the secondary results of a primary affection; of these latter I shall mention lateral curvature arising from rickets. There are few cases of diseased spine which offer such an afflicting sight as rickets in its worst stage; and the more so, as it very often arrives at that state through the negligence of

parents in not applying for medical relief till the disease is past cure.

It has been already stated, that when the bones are affected by rickets, they are soft, and yield under the weight they are incapable of supporting, or are bent by the powerful contraction of certain muscles, but that by proper care and management, they can be remoulded, or remodelled into their proper shape. Cases of this kind are by no means uncommon; but I do not consider they constitute the simple form of lateral curvature; they depend on a constitutional affection that attacks not only the bones of the spine, but those of the body indiscriminately, whereas in true lateral curvature the bones of the spine alone are affected. The first object in such cases must always be to remove the whole weight of the body from pressing on the softened bones, and to prevent the muscles from further altering their natural shape, by the aid of artificial support.

Change of air, a proper attention to and regulation of diet, sea-bathing,—or, where that is impracticable, a solution of bay-salt may be substituted with advantage,—and moderate exercises will all prove beneficial, and induce the bones to a healthy tendency. Cases of lateral curvature with rickets,

or even this latter disease alone, should never be confined in the close wards of a hospital; fresh air is one of the most essential agents to which the disease may be expected to yield; and however well-ventilated a ward may be, still the atmosphere is somewhat injuriously impregnated by the different invalids it contains; and I have invariably seen such cases get gradually worse after their admission.

Artificial support is not advantageous in all cases of severe lateral curvature: I have seen many where it has produced an opposite effect; a specific diagnosis of which however it would be difficult to give. I shall therefore content myself by detailing a case in which artificial support was productive of very great benefit; thus leaving the propriety of its application to the judgment of the medical attendant, formed upon the general character and appearance of the disease.

CASE. (Plate XV.)

Sarah Ward, nine years of age, was admitted into the hospital under my care, November 23, 1838, suffering from the effects of lateral curvature, with a weakness in the legs, and the knees bending inwards. Upon inquiry, and from the state-

ment of a medical gentleman, I learnt that at the age of two years and a half she was placed out at nurse, where she remained for two years, when it was discovered she was suffering from syphilis; which was cured by a regular course of mercury: she had previously complained of pains in the head, which her friends attributed to water in the brain. Shortly after, her mother observed a slight curve in the spine, the shoulder projecting on the right side; this gradually increased, the back became very weak, and the child used frequently to fall down suddenly when walking out, complaining of pain and weakness in her side. An examination of the back discovered two curves, the first between the bladebones, its convexity being towards the right side; the other was formed in the lumbar vertebræ, in the opposite direction: the knees were bent towards each other, and the general appearance of the child showed great debility. She was placed upon generous diet, and ordered to keep the recumbent position constantly, and the back to be rubbed twice a day. Tincture of iodine was prescribed to be taken three times a day, which was superseded by sarsaparilla and bark. This plan of treatment was continued with little variation until the 4th of January, 1839, when

On Zinc by G. Scharf

I ordered an instrument to be made for her, for the purpose of supporting the spine, and taking the whole weight from the vertebral column. This was effected by causing it to act as a fixed jointed crutch, passing from under the arm down to the hip, then to the knee, and lastly to and under the foot, with a joint at each natural articulation of the hip and knee; thus causing the whole weight of the body to be supported, whether in the erect or sitting posture, by the instrument. (See Plate XVI.) For the first few days after its application, an hour was sufficient to fatigue the patient, but she soon became accustomed to it, and when it was removed felt very much the want of its support; she afterwards constantly wore it whenever she was allowed to get up. About five weeks after it had been worn, it was found necessary to lengthen the steels at the various joints, and lateral parts of the spine. The frictions of the back were still continued, and sarsaparilla and liq. potassæ prescribed internally. She continued improving till the middle of May, when she was considered sufficiently recovered to become an out-patient, the springs in the interim having been elongated to the extent of some inches. After the patient's discharge from the hospital, her friends neglected to follow regularly the treatment

prescribed; the instrument got out of order, or was broken, and not immediately repaired, and thus she was compelled to remain in bed. From negligence and inattention, the instrument at last became quite unfit for use, and the patient was readmitted into the hospital in the following November. It was now a twelvemonth since the treatment of the case had commenced, and notwithstanding the unfavourable circumstances that resulted from the neglect of the parents after her discharge from the hospital, the general character of the disease was much mitigated. The curvature of the spine had considerably diminished, the legs were perfectly straight, and the knees were in their proper direction. The pelvis was measured, and found by comparison with a previous measurement taken at the time of her first admission, to have increased in the same proportion as the rest of the body, thus indubitably proving that it had not been contracted by the pressure of the instrument upon it. The same treatment as before was pursued, and care was taken that the patient should not get up without the instrument being properly adjusted. She was again discharged from the hospital on the 13th of May, 1840, the spine being then perfectly straight,

and her general health and strength greatly ameliorated.

Sept. 1840.—I have seen Sarah Ward several times lately; the cure does not progress so successfully and rapidly as might have been anticipated from her condition when discharged from the hospital.

Remarks.

The foregoing case, independently of its importance as connected with lateral curvature, will also serve to illustrate this very important fact in pathology, which however foreign to my subject, I cannot refrain from submitting to my professional readers; viz. that the means adopted for the cure of one disease will occasionally bring into action another of a more formidable nature, which had hitherto lain dormant in the system. In the present instance I am of opinion that a predisposing cause to debility in the system was brought into action, and manifested itself by attacking the spine, from the effect produced by the syphilitic affection, or the exhibition of the mercury. Two cases in point present themselves so forcibly to my memory, that I shall venture to give them. The first is of a healthy-looking child, who had a small nævus

removed by the knife; the wound soon healed, but fungus hæmatodes immediately appeared, attacking the joints and face. The disease baffled every attempt of science, and the patient soon fell a victim to its ravages.

The second case occurred when I was assistant-surgeon at the hospital. A healthy-looking woman was admitted under the care of Sir Charles Bell, wishing to have a tumour removed from the thigh, and I was requested to operate. The appearance of the patient and the wound were favourable for the first two days; but after that the wound became unhealthy, and in a week the patient died. On a post-mortem examination it was found, that medullary sarcoma had attacked the liver, which soon terminated fatally, while the tumour I had removed was not of a malignant nature, being of the fatty kind. The removal of the tumour in the above cases must be considered as the cause of the rapid development of the constitutional affection. Whether the malignant disease would have shown itself later, and in a more mitigated form had the tumour not been removed, must be a matter of conjecture, but I think the subject is of sufficient importance to merit attention

I have dwelt very considerably on lateral cur-

vature, but not more than its importance required; nor can I dismiss the subject without a concluding remark. We have seen by the illustration of the foregoing cases, how much depends on the means employed by the practitioner to arrest the progress of the disease; and I must again caution them against reposing too much confidence in the care of the parents and friends of their patients. We also see the great responsibility attached to those under whose care the patient is placed, and to whom I would give this important advice: never, —from any supposed notion of superior skill and experience, or even from the ameliorated condition of the patient—confide too much to your own resources in following up a treatment commenced under medical auspices.

ANTERIOR CURVATURE, OR INCURVATION OF THE SPINE.

This affection is the least common of those to which the vertebral column is subject, and is of a very serious character from the rapidity with which it increases after it is once developed. On examining the back of a patient suffering with this disease, we find—by tracing the spinous processes of the vertebræ downwards—a hollow or concavity in the back, formed by the upper and lower vertebræ being pulled backwards by the extensor muscles of the spine, while the walls of the abdomen are pushed forwards; the deformity varying and increasing according to the duration of the affection.

The muscular action that causes incurvation of the spine, may be opportunely explained here.

The spine has several muscles attached to it;

those in the back are termed the extensors, and are very numerous ; whilst those in the front are but few in number : there are, however, other muscles which serve as the flexors to the vertebral column, and act as antagonists to those in the back. These muscles, in a healthy condition of the vertebræ, maintain the spine in its natural position, but if any part of it becomes soft or weak, then one set of muscles will have more power over the spine than the other. Thus, for example, if the membrane covering the anterior parts of the bodies of the vertebræ, and intervertebral substance, become flaccid, and disposed to yield, the extensor muscles will draw the spine back—for their antagonists, the recti muscles of the abdomen, will be overpowered, and by these means incurvation of the spine produced ; or, if the recti muscles of the abdomen are incapable of acting as antagonists against the extensors of the back—on account of their attachment to the cartilages of the ribs, or their origin from the pubes being soft or weakened—they lose their power of keeping the spine in its proper state, which will then be gradually pulled backwards by the action of the extensor muscles, although the spine itself is in a healthy state. Thus, then, incurvation may be the result of a weakened state

of the vertebral column, or of an unhealthy condition of another part.

Incurvation may arise from the same causes as the other affections of the spine, and also from rickets, mollities ossium, syphilis, scrofula, &c., so that it becomes a matter of considerable importance to ascertain the predisposing cause, before we attempt any plan of treatment for its removal. In most cases our diagnosis may be accurately formed from the general symptoms that accompany the primary disorder; thus, rickets may be known from some of the bones, as those in the leg or arm, being softened, and bending under the action of the muscles;—mollities ossium, which is very rare, from great pains all over the body, feverish and scorbutic symptoms, startlings, inquietude, and a copious white sediment in the urine;—syphilis and scrofula from the distinctive character of their respective diseases, which are too well known to require any particular description.

After clearly ascertaining the cause of the affection, we may proceed with our plan of treatment, in which we must always be guided by the nature of the predisposing disease. In scrofula and rickets our first attention must be directed to the medical treatment of the constitutional disease: change of

air, sea-bathing, ablutions, frictions, rest, extension and support by artificial means, may be had recourse to, either collectively or successively, as the nature of the disorder dictates, the practitioner carefully watching the progress of the case, and persevering in those remedies which prove beneficial, and rejecting those from which no palpable good is derived; the removal of the weight from the spinal column being always kept in view, as a fundamental principle on which success may be expected. The same plan of treatment will hold good in incurvation caused by chronic inflammation of the structure of the bones, or surrounding membranes. In these cases artificial support and extension will prove very beneficial. In incurvation of the spine caused by rickets, exercises in the dorsal recumbent position, and extension, will prove of some service under judicious management: and when instruments are used, they should be made with great care, and as cautiously worn, for the law which will allow the bones to resume their natural shape and position under proper support, will also permit of their being still more distorted by its improper application. The spine supporter, and in fact every instrument used in these cases, should be frequently examined, and altered as the

case proceeds, particularly as regards the pelvis, in which, should any contraction appear, it would be more advisable even to discontinue its use than persevere at such a risk. I have found thin splints made of ash, and apposed to the curve by the assistance of rollers, of very great use, and their application has been successful in several cases; they should be removed daily, and require much attention. Mollities ossium, or even rickets, may cause the spine to be so completely incurvated, that the head may be almost made to rest upon the os sacrum. There is a case on record, and which I had occasion to see several times whilst under the care of the late Dr. Harrison, where the back part of the head rested nearly on the sacrum. The patient was perfectly cured. The plan pursued was extension by means of pads, placed first between the head and the sacrum, and as soon as any part yielded to it, the improved position was maintained by artificial support, and then more extension employed till further improvement took place: by continuing this treatment, the patient was ultimately quite restored to health.

This case fully illustrates what I have before stated, that nature is always ready to assist art in her endeavours to restore the form to its nor-

mal condition; her laws are fixed and unchangable in the formation of the animal kingdom; and whenever distortion or disease occurs, she will invariably set about a process for removing it; we need therefore only direct our attention to second her efforts, to ensure in almost all cases permanent success.

I have before stated that the muscular system takes an active part in curing, or in causing affections of the spine to increase; and we must be very mindful in our treatment not to lose sight of this very important fact, for where in some cases the action caused by the contending power of opposite muscles will strengthen and invigorate the surrounding parts, and excite a healthy osseous secretion, so in others the conflicting power of the stronger muscle over its antagonist, will only displace the bone, increase the curve, and produce incalculable mischief. The plan to be adopted in the first case is self-evident, viz. steady, uniform, and gradually increased exercise; in the second, the practitioner must refer to earlier recollections, and examine the relative position, origin, insertion, and action of each muscle he would control; and so place the patient, that they may all be brought into a state of repose. Nature will then do her work,

and by the continual change that takes place in the organic structure, will in the course of time restore the bone to its natural shape and solidity.

The restoration of a bone to its original shape is beautifully illustrated in cases of Necrosis, where a dead piece of bone is contained in, or surrounded by the living. Modern surgery has taught us to displace a small portion of the healthy bone, to be enabled to remove the dead piece, when the ill-shaped remaining bone becomes remodelled and reformed in the course of time, by the continual change that takes place in the system by the process of waste and renovation.

POSTERIOR CURVATURE, OR EXCURVATION OF THE SPINE.

This affection is not so frequent in its appearance as lateral curvature, but is more serious, attacking the cervical, the dorsal, and lumbar vertebræ, or even the whole spine; and may be attributed to a softness in the structure of the bodies of these bones and the intervertebral substance; the solidity of which when attacked is not sufficient, even with the aid of the extensor muscles, to retain the spinal column in the erect position; whilst the abdominal and psoæ muscles, with those of the chest and neck, contract for want of a resisting power to keep them in their places. I have before alluded to this contractibility of the muscular system; and as a knowledge of it becomes of paramount importance in these cases, since it points out the path we are to follow in treating this class of affections of the spine, I shall again refer to it. If the attachment of a muscle or set of

muscles become displaced, the equilibrium that hitherto existed between them and the opposing muscle or muscles is destroyed, so that either the extensors or flexors—not being restrained by the resistance which had previously kept them in their places—contract in the direction to which their attachments incline. It follows that while the one set is thus contracted, its opponent must be preternaturally extended, and incapable of counteracting the evil tendency of the other; so in excurvation, if we offer a sufficient resistance to the flexor muscles of the spine, and prevent their contracting tendency from increasing the curve, while at the same time we remove the weight of the body from it, we then allow the extensor muscles to resume their proper action, and gradually restore the bones to their places.

When this affection makes its appearance, the spine projects backwards, and if the cervical vertebræ are attached, that part of the spine forms an arch, which causes the head from its weight to fall forward, and the chin to rest upon the chest. A case of this kind was admitted into the hospital under my care in a child between three and four years of age, where the head was unable to keep its proper position, the chin resting upon the upper

part of the chest. I ordered the weight of the head to be removed from the spine, by the patient being kept in the recumbent position : liq. potassæ and tonic medicines were prescribed, with milk and good plain diet. The plan was followed with success, and the child cured in a few months. I consider this case to have arisen from the tardy development of the osseous system in that part of the spine, so that the bones had not acquired sufficient solidity and strength to support the weight of the head.

When the whole spine becomes affected, the patient gradually inclines the body forward: at first they rest their hands upon their knees, to assist the spine in supporting the weight of the body; but as the deformity increases, they rest their elbows on them, and when they walk will catch hold of anything they pass to assist themselves: and if the disease is unattended to, the weakness increases, and their sufferings become very severe.

Excurvation of the spine generally appears before the age of puberty, and more particularly when dentition is in active progress; hence it has been supposed that this process has considerable influence in promoting its development: it is however to be met with at a later period in life.

Some attention becomes necessary not to mistake caries of the bodies of the vertebræ for this affection, as at its commencement caries has some of the characteristics of excurvation; but they may be easily distinguished, as there is more of a general roundness in the curve caused by excurvation, whilst an evident projection, or the appearance of a knuckle, characterises caries. Should the lumbar vertebræ be the seat of the disease, the convexity will be in the loins; and here we ought to take some precaution before we pronounce our opinion, because in lumbar abscess there is occasionally a roundness to be observed in the lumbar vertebræ, even before the formation of the discharge takes place; and I would recommend the practitioner to see the patient more than once before he gives his decision.

There are other causes, however, that will produce excurvation, but they are the same as those we have before noticed, that produce other affections of the spine, viz. general debility of the vertebral column, scrofula, rickets, mollities ossium, chronic inflammation, syphilis, mesenteric disease, and general caries on the anterior surface of the bodies of the vertebræ. But enough has been said to enable the reader to understand the treatment

of these different forms of the complaint, without again entering fully into their details: a few remarks however may be necessary, respecting excurvation arising from disease of the mesenteric glands.

When the mesenteric glands are enlarged, they press against the bodies of the vertebræ, and cause them to become softened; and while in this enlarged state, the chyle will not be carried into the system, nor the bones duly and healthily nourished. This form of the complaint may be looked upon as a scrofulous affection; the primary seat of the disease being in the glands placed between the mesentery, and not in the spine. It mostly occurs in children, and several cases have come under my notice where this has been the cause of the excurvation. Strict attention to diet in these cases is of the utmost importance. I remember seeing a case of this kind under the care of a professional friend, where he was employing the most judicious treatment; but upon visiting the patient one day, we discovered the little child eating some fat and half-dressed bacon, the most improper food for patients suffering under disease of the mesenteric glands, where diet is of such importance. The

most effective treatment and medicinal aid will be of no service, except the diet of the patient be properly attended to. There is perhaps no disease where it will do more service than in the one under consideration, and consequently too much cannot be urged on this subject. New milk from the cow will be of service, provided the stomach is capable of receiving and properly digesting it. Liq. potassæ given in large doses will often be of great benefit. Iodine is also a medicine that will very frequently be found beneficial, and cause the glands to decrease in size. Tonics afterwards will prove of the utmost utility. I am inclined to pronounce cancer as a primary cause of this deformity of the spine. This malignant disease may first attack either the mesenteric glands, the surrounding membrane of the spine, the pancreas, or the cancellated structure of the vertebræ. When the cancerous disease attacks the glands, or other parts, the bones are pressed upon by the disease increasing, and the pressure will produce absorption, and the spine become bent. As the curve may be situate in any direction, and produce similar effects, these remarks may be applicable to the other curvatures of the spine.

I am much inclined to believe that cancer attacks the bones of the spine, and may be seated either in the cancellated structure of the bone, or towards its surface, and by its increase produce deformity. This formidable disease affects the other bones of the body, and why should it not affect the bones of the spine? It is true, I have never been able to examine a spine thus diseased, but I have a case now under my care, where I have every reason to suppose the bones are thus affected. Any attempt to cure such a disease will only prove abortive; but by arresting the progress of the deformity, we may lessen the sufferings of the patient, and prevent the disease from increasing so rapidly as it otherwise would have done, had the deformity been suffered to continue uncontrolled.

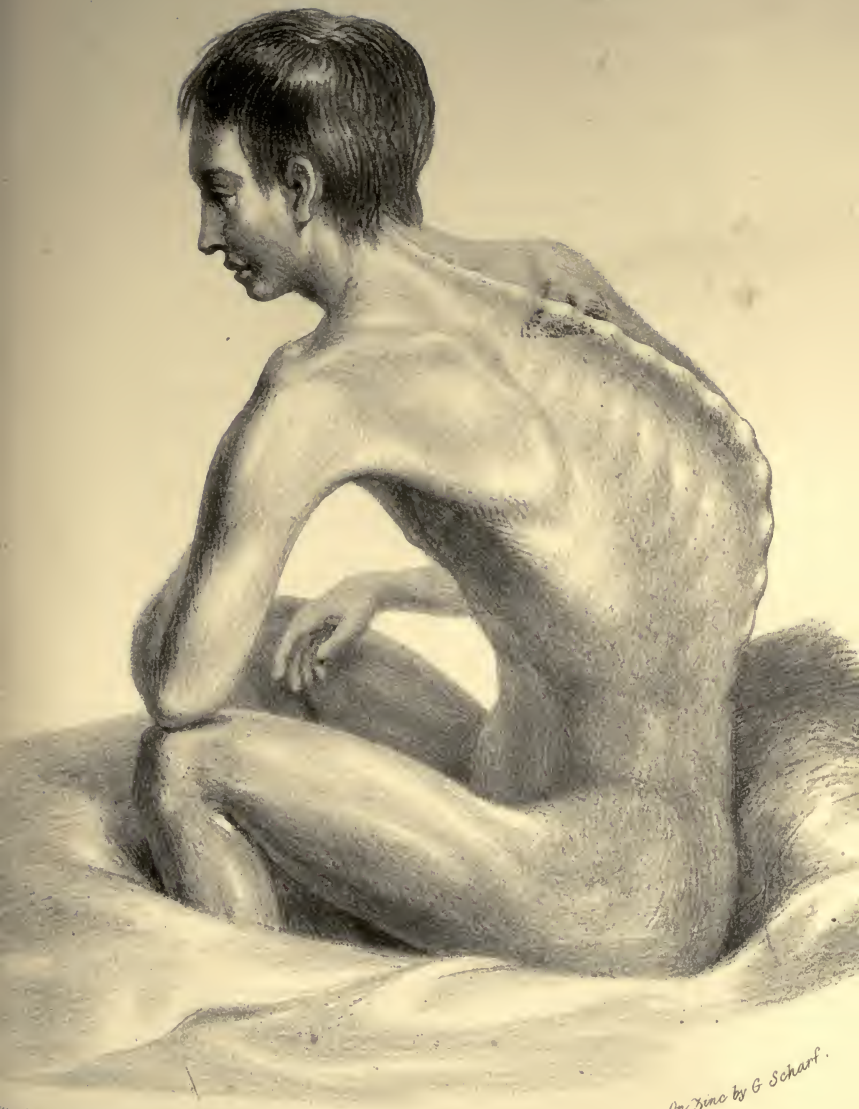
Should excurvation of the spine arise from disease in the bodies of the vertebræ at the whole of their anterior surface, which is sometimes the case, the observations made on caries of the spine may be referred to, and the treatment there recommended followed, according to the nature of the case. In many instances rest, and remedying the deformity, will cause the vertebræ to become anchylosed; a proper position therefore should be

most strictly attended to, and constant recumbency sedulously maintained.

In some cases of excurvation of the spine, I have found great benefit to result from the use of splints, as detailed in incurvation; as also from having a wooden shield made corresponding with the deformity of the back, and at first to have it firmly fixed on by means of flannel rollers; the hollow of the shield is then to be gradually filled up by pieces of flannel, until its whole concavity becomes occupied by them, making its inner surface straight, and of course the back is restored by these means to a natural state.

CASE. (Plate XVII.)

William Skevens, aged seventeen, by trade a tailor, was admitted into the hospital under my care, 12th November, 1839. On examining the back, a complete excurvation of the spine was observed, which commenced about the second dorsal, and extended to the second or third lumbar vertebra. As there was no tenderness of the spine by pressure against it, or by percussion on the spinous processes, I did not attribute the deformity to caries of the bodies of the vertebræ. He made the following statement. When about nine years



WILLIAM SKEVENS, AGED 17.

of age he felt pain in his back, particularly after carrying any weight, which he was obliged frequently to do. At that time there was no projection of the spine, but about a year since, it first made its appearance, and has rapidly increased, until it acquired its present state. The pains which at first were slight, gradually increased; and when he attempted to draw the back up to the erect position, they became very violent, and made him (to use his own expression) 'puff and blow.' He sometimes had difficulty in making water, feeling a desire to do so, but without being able to accomplish it. He had felt numbness in his arms and legs, but never lost the use of them. After eating, but never at any other time, he felt shooting pains down the spine, which lasted about two or three minutes. He feels tolerably easy when he stands; but when he stoops, and attempts to rise up again, he experiences a great deal of pain in his back. He is always relieved by lying down.

I ordered two splints to be made, extending the whole length of the abdomen and thorax; these were well padded with tow, and daily applied by means of flannel rollers in front, and on each side of the abdomen. Tonic medicines, full diet, and a pint of porter each day, were prescribed. In

the course of a fortnight after his admission, some slight improvement had taken place; he felt stronger, and the splints afforded him much support. The back was slightly improved.

December 12.—This patient has gradually been improving since the last report; all the symptoms are subsiding, the back is becoming straighter, and he gains strength. The same plan of treatment to be persevered in.

January 30.—The strength of the patient has considerably increased; the back is greatly improved in its appearance, but little excurvation of the spine being perceptible; he walks about the ward, and goes occasionally into the garden, and feels great support from the splints: all unfavourable symptoms have disappeared.

From this time the patient rapidly gained strength, and left the hospital soon after the last report, and attended as an out-patient. I have seen him since several times, and he finds no inconvenience from the former deformity.

CASE.

Frederick Ball, aged eighteen, a draper by trade, was admitted into the hospital under my care,

21st July, 1840, with excurvation of the spine, occasioned by stooping over the counter. He stated that fifteen months ago his back was quite straight, but since that time he found his spine gradually became bent, until he was nearly double: he suffers under great difficulty in breathing, giddiness in the head, and weakness of the extremities. A medical friend brought this patient to me a short time before he was admitted, when I recommended him a plan of treatment; but as he could not follow it satisfactorily, I took him at his request into the hospital. Twenty drops of liq. potassæ were ordered to be taken three times a day, and full diet; a warm plaster was applied all down the spine, and two splints were fastened over the abdomen and thorax by the aid of flannel rollers. This plan was regularly continued until the beginning of September, when I ordered a wooden shield to be made as light as possible, to correspond with the spine, which had improved in its appearance, but not to such an extent as I could have wished. This shield, which was of deal, had on the left side, a support for the arm to rest upon, and was removed and replaced daily, being firmly attached to the body by the aid of flannel rollers. Each time it was removed, an additional layer of flannel was inserted

compressed than the other: if seated in the lower cervical, it will be flattened, and the sternum drawn downwards and inwards, the patient experiencing great difficulty in breathing, owing to the inaction of the scaleni muscles in not pulling up the ribs. The chest is then very flat at its anterior surface, and when viewed in a lateral direction, will in many cases impress you with an idea that there can hardly be room for the trachea and vessels to pass at the upper part of it. Should the lumbar vertebræ on the contrary be the seat of the disease, the ribs on each side will be sunk down, and may be depressed even below the crest of the ilium, resting on the iliac muscles. But the chest is in these cases more dilated than when the disease affects the cervical vertebræ, for the sinking of the ribs is owing to the bodies of the lumbar vertebræ falling forwards, whilst the scaleni muscles retain the power of elevating the ribs. From this short analysis of the different appearances of the chest that present themselves in angular projection, it must appear obvious that no possible good can result from attempting to cure them, whilst the caries of the vertebræ, which constitutes the primary cause, remains unchecked.

Caries may be considered as a peculiar morbid

state of bone, being the termination of inflammation, but may be dependent also upon other causes. A bone thus affected is in a state of ulceration, and is in the same condition as any open wound.

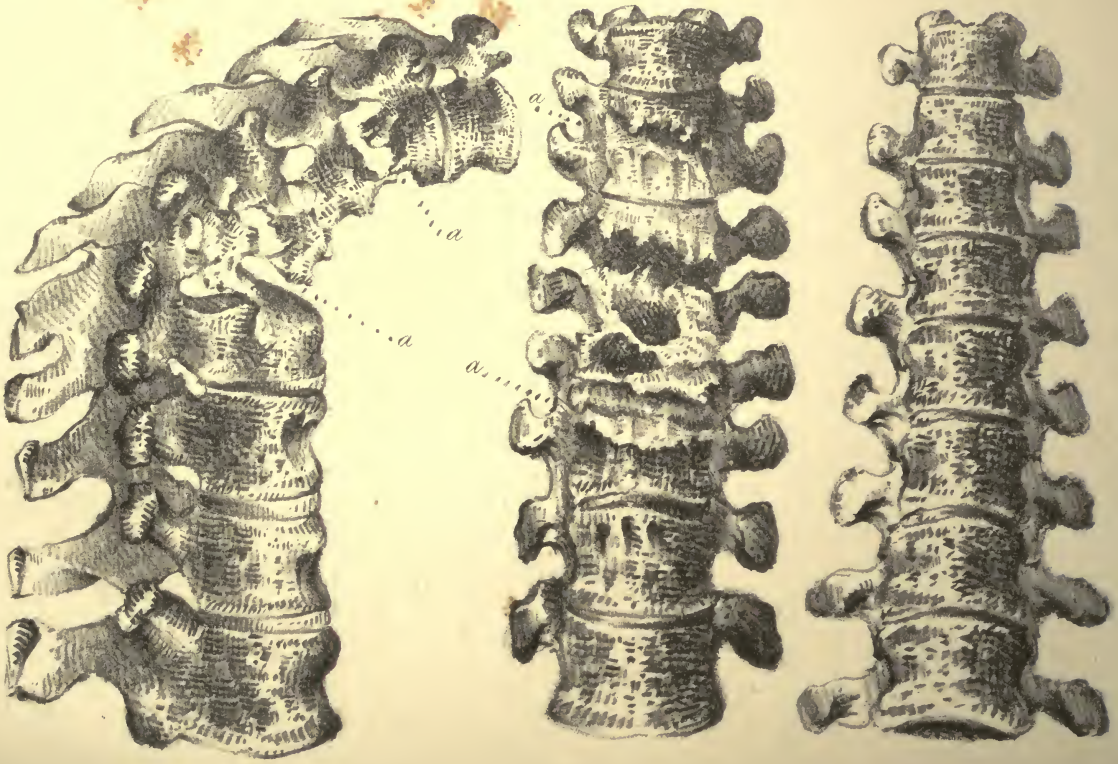
This disease has been ascertained to arise from three causes: caries of the bone, ulceration and destruction of the intervertebral substance, and a scrofulous state of the spinal column: but from observations I have made, and numerous cases that have come under my care, I have formed a conclusion that it may also arise from inflammation commencing in the membrane that covers the upper and lower surface of the bodies of the vertebræ, connecting the intervertebral substance with the bone, and then extending itself into that substance, and its cancellated structure.

From whatever cause this class of affections of the spine may arise, whether from accident or constitutional predisposition, it must be considered as one of the very worst that can attack the vertebral column, from its tendency to destroy the bones, and other parts that enter into its composition.

In the earlier stages of this disease, the patients feel pains in their backs, an uneasy sensation in the legs and other parts of the body, when brought into action in certain positions; great difficulty in

ascending acclivities or stairs; are compelled to support themselves with anything they can lay hold of, or rest their hands on their knees; and suffer from palpitations, oppression in breathing, and pains in the head: but as it increases, they experience partial or total paralysis of the lower extremities and other parts of the body, great difficulty in making water, which is often tinged of a high colour, while the alimentary canal is sluggish in performing its functions, causing pain in the abdominal region, and sometimes the alvine evacuations will pass without consciousness to the patient.

When the disease arises from caries of the vertebræ, or ulceration and destruction of the intervertebral substance; or that its development depends upon the presence of a scrofulous condition of the spinal column; its appearance may be mostly traced to some external injury, as a blow, a fall, carrying too great a weight, or some sudden jerk of the body. In cases having their origin in an accident, the patient will sometimes be enabled to continue their accustomed avocations, the affection not directly manifesting itself, whilst in others the accident is immediately followed by a dull benumbing pain in the back, and sometimes by a total loss of muscular power, causing the patient to



On Zinc by H.F. Coley.

fall. These cases require immediate surgical assistance, as in its earlier stages little difficulty will be found in arresting the disease, which must develope itself very rapidly if the spine is left in a state of activity. This is owing to the chronic inflammatory action that is caused by the accident, progressing gradually, ultimately causing caries of the bone, or ulceration of the intervertebral substance and membranes covering them, and ending in the loss of bony structure, which with the contracting tendencies of the adjacent muscles, causes the spine to sink and bend forward.

The loss of bony structure, and the effects of muscular contraction in a diseased spine, will be found illustrated in the annexed plate. (Plate XVIII.) It represents a portion of the spinal column, consisting of the lower cervical and upper dorsal vertebræ in three different conditions. Fig. 1.* is a side view of it in a diseased state, and curved in its upper part from the weight of the head pressing on the diseased bones; causing them to bend forward, whereby the flexor muscles of the spine gain an increased contracting power, which their opponents, the extensors of the back, are incapable, from over extension, to counteract. We

* Fig. 3. represents a front view of the same portion of the spinal column in its normal condition.

also see *(a a)* that the disease has nearly destroyed the bodies of two of the vertebræ; so that, as long as the weight of the head and the contracting power of the muscles are allowed to act upon them, the curve will increase until they touch each other; nor will it then cease, for the bones being in a diseased state, pressure will not only increase their absorption, but tend to communicate the caries to the adjoining healthy parts, by the discharge coming in contact with the other bones.

Our first attention, therefore, in these cases, will naturally be directed towards the means by which such undue influence is to be removed; and secondly, to what is to be done to prevent their recurrence. To effect the first of these considerations, if we remove the immediate cause, we arrest its progress, and by offering a greater resisting power, we counteract the undue influence before exercised; so, if the weight of the head be removed from the spine, and the flexor muscles compelled by a superior power to cease their action, and allow the extensors to resume theirs, the spine will be brought towards its erect position, as in fig. 2. Here it will be observed that the spine is still in a carious condition, which extends from *a* to *a*, the first consideration having alone been gained, namely, that of removing the curve. To obtain the second,

we must start from two given points in physiology and surgery ; the first, that when there is a diseased bone, nature will invariably set about a process for its restoration to a healthy state: the second, where surgery teaches us that when nature cannot of her own accord accomplish this, from the abnormal condition of some of the parts, we have only to replace and maintain them in their proper position, so that the surrounding vessels may be free to perform their various functions, and she will set about a healing process.

If then we can succeed in obviating the immediate tendency to deformity, and arrest the progress of the disease by exciting a healthy condition of the parts, we may anticipate that the loss of bony structure will be replaced, and the spine regain sufficient strength to again support its accustomed weight. But it is not always that this desired end can be attained, for there are insurmountable obstacles to following or using the requisite plan to accomplish it; for nature may have already attempted to relieve the weakened spine by the deposit of fresh ossific matter before the case comes under our treatment; and any extension that we might then use would only be productive of harm, in obstructing her operations. It is difficult to

point out in what cases extension might be used with safety, as the deformity is only the result of the slow and gradual development of the disease: but in almost every case, although we dare not use sufficient extension to completely cure the deformity, we may nevertheless considerably ameliorate the condition of the spine, and prevent further distortion.

In the early stages of the disease much may be anticipated from judicious treatment, not only in arresting the progress of the deformity, but in restoring the spine to its natural state; always bearing in mind that the plan of treatment must be persevered in for a considerable time after all the symptoms have entirely disappeared; or otherwise the slightest exciting cause will determine a fresh development of it. A knowledge of this fact is important, as it will enable us to ascribe the reappearance of the disease to its right cause, and not to a supposed inefficiency of treatment.

When this disease commences in the centre, side, or anterior part of the intervertebral substance; either ulceration or suppuration follows, which coming in contact with the bone, occasions a disease of its cancellated structure; and although only a small part of the column may be at first

affected, the disease will spread to a considerable extent. When it commences in the centre, the intervertebral substance loses its solidity, becomes flabby, and gradually changes its colour from a greyish hue, till it ultimately assumes a blackish appearance, more particularly towards the middle of its structure. This is owing to its soft condition, even in the healthy state, which is necessary, to allow the bones to move easily on one another, and increase the mobility of the spine.

Lateral curvature may also result from this cause, for when the centre of the intervertebral substance is the primary seat of the disease, it may extend itself either forwards or sideways, and would therefore produce two different results, viz. angular projection when the anterior part of the bone participates in the disease; and lateral curvature when the sides of the bodies of the vertebræ are affected.

If the disease first attacks the membrane covering the upper and lower portion of the bodies of the bone, it becomes loose, and is easily separated from the bone itself. The morbid action of the disease then progresses rapidly, and the deformity speedily shows itself. The same effect, I may here observe, is sometimes seen in diseases of the knee-

joint, where the cartilage attached to the bone becomes affected in a similar manner.

Acute, or chronic inflammation, or an unhealthy state of the bony structure, dependent upon constitutional causes, will often dispose the vertebræ to caries, the inflammatory tendency being generally excited by external violence, exposure to cold, &c.; whilst the predisposing cause may be attributed to scrofula and other hereditary complaints. Small-pox and syphilis may also be productive of the same results, from their action over the general economy of the frame.

The repeated exhibition of mercury, more particularly when given to children as an aperient, may predispose to this disease; and I cannot divest my mind of the idea, that given as it is in large doses to them, it must be very pernicious. When the body is daily growing and gaining strength, that process ought not to be interrupted by the action of *any* powerful medicines, more particularly those which we know will be carried into the system. The *modus operandi* of most medicines is still involved in obscurity, and after years spent in scientific research, and the attainment of practical experience, medical men still prescribe them with caution and prudence. The baneful effects arising from the improper administration of medicines by

the uninitiated, are constantly coming before the public; but there are a class of persons to whom I would more particularly address this caution and advice: I refer to the heads of families, who are in the habit of doctoring their children with medicines from the family medicine-chest, the use and effect of which—however they may flatter themselves—they can be but little acquainted with, and therefore incapable of appreciating the mischief that may result from their improper use.

It has been observed that this disease may commence in the centre, or at the sides of the cancellated structure of the bodies of the vertebræ; in which, on examining a bone thus diseased, we shall find, it will be softer, and possess a greater degree of vascularity, and it is of a higher colour than in its natural state: and denotes an immediate appearance of the caries, its progress being quicker in the bone than when it commenced in the membrane covering it: as the process of ulceration in cartilage is slower, arising probably from the soft parts being endowed with a greater degree of nervous sensibility, and having more power to combat against the increase of the disease, and more energy in assisting a re-establishment of a healthy condition of the membrane.

In all cases of angular projection, a tendency to suppuration will appear, which, as well as the collection of matter, should be counteracted by every means in our power; for the production of an abscess will greatly increase the disease, and sufferings of the patient, not unfrequently producing paralysis of the lower extremities and other parts of the body.

Sometimes, notwithstanding our best-directed efforts to prevent its formation, pus will be deposited, and may point in different parts of the spine: for instance, although the disease is seated in the upper part of the back, the matter may accumulate, and at last point at its lower extremity, or at the inner part of the pelvis by the side of the tuber ischii. Should it be deemed advisable to open these abscesses, a circumstance which is often indispensable, a valvular incision is by far the safest that can be adopted; and after the discharge of the pus, the edges of the wounds should be closed, and kept together with small pieces of adhesive plaster, and great attention paid to endeavour to induce it to heal by the first intention, as it may be again opened at any future period, should it be required.

In spite of our endeavours to promote the union

of the wound, it sometimes happens that it cannot be effected, and the discharge will continue to ooze from the opening; producing great debility, and a general derangement of the economy, attended with shivering fits and fever, which may continue for some time, or cease after a few days.

Bad results do not always follow from this protracted cure of the opening, as the following case will show.

A girl with angular projection and abscess was admitted into the hospital under the care of Sir Charles Bell. It was considered necessary to open the abscess that had pointed in the inguinal region, which was done with a valvular incision, and the pus allowed to make its free exit; the wound was then closed, but did not heal. Subsequently the girl was attacked with rigors, which lasted for three hours, and they were succeeded by fever. The discharge continued for four days, and then decreased gradually, and ten days after, the patient was enabled to leave the hospital. The abscess proved to be the result of an old disease of the spine, and was one of the quickest cures I ever remember to have seen.

When matter forms in cases of diseased spine, it seldom if ever points towards the cavity of the chest or abdomen; for nature, aware of the bad

consequences which would result from its breaking inwards, always induces it to point outwards. The same thing occurs in abscesses formed in the walls of the abdomen, they seldom point towards the peritoneal cavity; this is prevented by fibrine being deposited on the inner walls of the abscess, causing the matter to form superficially: so in angular projection, when matter collects in front of the spine, fibrine is deposited towards the thoracic or abdominal cavity, which causes the abscess to point in different parts of the back. A case was admitted into the hospital under my care, where the man complained of deep-seated pain in the back, opposite the upper portion of the sternum, and behind the throat, which ended in the formation of an abscess that broke in the fauces: the patient shortly after died. On a post-mortem examination, the cervical vertebræ were found to be in a state of caries, a large swelling was observed in front of the second, third, and fourth dorsal vertebræ, which were also diseased, and proved to be an abscess, the walls of which were thick and strong towards the cavity, and weak and thin towards the back; and I have no doubt had the man lived, it would have pointed at the lower part of the neck.

The method to be adopted, and the plan to be

pursued, in order to prevent the formation and collection of matter, have been hitherto a subject of much controversy. Such a variety of opinions have been advanced, and so many arguments used by the advocates of the several plans, that it has been difficult for the practitioner to decide which to adopt, amidst such a discrepancy of opinion.

In advancing, therefore, any plan, we should be guided by a careful investigation of the effects produced from the remedies employed, and not biassed by prejudices imbued from any previously advanced opinions.

It is a singular fact, that the most fallacious treatment of this disease took its rise from the misapplication of the writings of the erudite and scientific Mr. Pott. He wrote, and was the first, I believe, who assigned the effect of this disease to its right cause. He ascribed the loss of solidity in the spinal column to *caries of the vertebræ*, and founded his plan of treatment on a scientific basis, and a thorough knowledge of the subject. He prescribed counter-irritation, issues, blisters, and other similar applications, with constant recumbency. But never for a moment did it, or could it enter into Mr. Pott's head, to recommend this treatment as the universal one, to be followed in all cases indiscrimi-

nately. Many of his followers thought otherwise, and under the sanction of his name, applied them whenever an opportunity occurred. The results attending such a practice may be anticipated. Those cases in which Mr. Pott really intended the plan should be followed, were successful, whilst in others the patients experienced no relief; and dissatisfied sought those who, without any or at best very little knowledge of the subject, promised to cure their deformity without exposing them to the painful effects of issues and other external applications.

The unfortunate result arising from this indiscriminate use of issues, blisters, &c. has been, that many scientific and well-informed practitioners have discontinued their use, and pronounced them valueless. And thus it is in many instances medical men are apt to form an opinion of a pharmaceutic agent, from the effects produced in cases that have come cursorily under their notice, without stopping to investigate the propriety or impropriety of its application.

This shows the absurdity of advancing any plan of treatment for all cases indiscriminately. A separate *prognosis* must be formed for each particular case, and the mode of treatment based upon it; for however apparently similar any two cases

may appear, there are so many secondary circumstances to be considered, relating to the rise, development, and progress of the disease; the general health and habits of the body, and constitution of the patient, that after a proper investigation, such a dissimilarity in the *diagnosis* will result, as to require nearly an opposite plan of treatment.

Another important feature in the treatment of this disease has been extolled beyond its merits, and from this cause has led to error. The great relief experienced by patients from constantly reclining in cases where they could with difficulty be moved, has gained many advocates, by supposing that *rest* alone was sufficient to effect a cure, no account being taken of the caustic issues used in conjunction with it. That rest is of essential importance to the restoration of many parts when in a debilitated state, is strikingly pointed out in surgical cases, as in injuries of the leg, fractures, &c., and in a number of diseases which oblige the patient to keep in bed, as it enables the functions of the animal economy to set about reestablishing healthy secretions in the deranged system: but in angular projection of the spine, rest *alone* will not act as a preventative against the formation of matter, nor arrest the morbid tendency of

the bones to caries, which are the most important points to be gained before we can hope for a cure.

Counter-irritation is another efficient remedy that has fallen into disrepute from its injudicious use, it having been alike applied to angular projection, lateral curvature, and a scrofulous state of the bones. I must consider this a very useful agent in angular projection, and shall hereafter point out those cases in which it will be essentially necessary in affording relief.

Blisters are of service when the pains and other symptoms are not very severe, and there exists little palsy. The application of potassæ fusa round the projection, which should be touched in three or four places, will be found beneficial; and should afterwards be poulticed till the slough comes away, and the wound heals; when fresh issues may be made in different places, and treated as the first. Sir Charles Bell was in the habit of ordering the caustic potash in this manner, with beneficial results, and I have followed the same plan, when the case would allow of it; so that I can safely recommend its use when a very copious discharge is not required, as it gives much less pain than the ordinary issues: they should be about the third of an inch in diameter. But in

those cases where issues are required to act more energetically and extensively, and to remain open for a considerable time, we must have recourse to the common issue.

In almost all cases of caries—not of a scrofulous kind—caustic applications will prove of the greatest benefit, and this may often be seen before the slough has had time to come away. Some persons may be inclined to assert that the benefit should be attributed to the repose which the patients experience during their application. In reply to this it is only necessary to state, that it often happens that the issues are only used when the recumbent position has been tried for some time without any success. If however issues are useful in these cases, they have a diametrically opposite tendency when the predisposing cause is scrofula; nothing but mischief can result from their application in such cases, and under no consideration whatever should they be used.

Exercise, which has been recommended in lateral curvature, should be entirely avoided in the treatment of caries of the vertebræ; and this will be readily conceived, if we reflect for a moment on the means by which the parts are to be restored.

When bone and cartilage become diseased, and

a loss of substance follows, the process of renovation is effected through the medium of anchylosis. This consists in the deposit of a gelatinous substance in the diseased part, from which ossific matter is thrown out, that fills up not only the loss of bone, but cartilage also, it being a known law in pathology, that when cartilage is cut or diseased, it never unites but by bone, and when in conjunction with it, forms that species of union called anchylosis. Thus then in lateral curvature, the abnormal condition of the spine depends on the want of a proper development of the parts, caused by too much inaction, improper pressure, &c. &c., but *without loss of structure:* whilst in angular projection, on the contrary, there is a morbid action, *with loss of structure;* and therefore the reproduction of those parts destroyed by ulceration is necessary to effect a cure. Bone must be restored through the medium of bone, as I have above described; would it not then be the very height of folly to recommend exercise when this process was going on? It must appear evident, that the recumbent position, with perfect repose, is the only salutary plan that can be adopted.

A general definition of scrofula is not easy, but our present purposes will be sufficiently answered,

by defining it as a peculiar state of the lymphatic vessels and glands, producing an unhealthy condition of the skin. The characteristics that distinguish it are a very thin skin, through which the vessels may easily be seen; the hair light and very fine, the fingers long, with their extremities broad and flat, and the upper lip much thicker than the lower. The lymphatic glands in some parts of the body are enlarged, the abdomen swollen, from the increased size of the mesenteric glands, and the pupil of the eye dilated. When these, or any of these symptoms present themselves on our first examination of a case of angular projection, we should endeavour to assure ourselves of the existence or not of a scrofulous habit, before we decide upon our treatment; for we must always bear in mind the different plan that should be pursued, if the presence of the constitutional affection is ascertained to exist.

It has been remarked by the late Mr. Earle, who treated affections of the spine with considerable success, "that in scrofulous caries of the vertebral "column, there appeared to be some evidence of "a diseased action in the vessels, which deposit a "carious substance in lieu of bony matter." This peculiar state of the body in scrofulous subjects

cannot be easily accounted for; and whether it arises in the arteries, they not performing their wonted office in carrying a healthy secretion to all parts of the body, a process so essential to its renovation; or whether it is to be ascribed to the lymphatics, is difficult to decide.

That scrofula more readily attacks the lymphatic vessels and glands, is, I believe, an established fact; so that it is most probable that the primary seat of the disease may be assigned to them. Now in this hypothesis, although a healthy and nutritious chyle is produced by the proper assimilation of the food, it cannot be taken up by the lymphatics to supply the vessels that were to distribute it through the body, for the general nourishment and renovation of the economy. I am therefore inclined to infer that the disease first affects the *lacteals of the alimentary canal*, and that afterwards the arteries deposit the unhealthy secretion alluded to by Mr. Earle.

In the treatment of scrofulous cases of angular projection, our first care must be to arrest the constitutional complaint; and to effect this we must ascertain where the disease is seated, as the deformity of the spine may result from its action. Thus, if the mesenteric glands are enlarged to any extent, they will press on the spine, and cause dis-

tortion ; but if we remove the pressure, the curvature—being only the secondary result of the disease in the mesentery,—will be arrested, and the cure progress with more rapidity.

The treatment to be followed for the removal of the scrofulous tendency, must be very similar to that recommended in lateral curvature arising from it : frictions, ablutions, sea-water baths, good diet, with plenty of milk, a good-sized and a well-ventilated room, and rest *in the facial recumbent position.* Iodine, liq. potassæ, quinine, and other tonic medicines should be administered, and slight extension ventured upon when the bones are supposed to be but triflingly affected, and the process of anchylosis not in action.

The iodine may be given three times a day, and occasionally changed for vinum ferri ; liq. potassæ given in milk in large doses also three times a day will be found very beneficial. The hydriodate of potash has proved successful in many cases, and I should advise its being tried. Vegetables, as a general rule, should be exploded from the diet, which ought to be plain and nutritious.

It will be observed that in lateral curvature the *dorsal* recumbent position has been recommended, whilst in angular projection the *facial* position is to

be adopted, as the advantages to be derived from it are very considerable. I remarked in the preceding pages that the sternum and chest were always more or less affected in angular projection, their distortion depending on the position of the disease in the vertebral column. If then we place the patient in the facial recumbent position, we not only remove the pressure of the body from the spine, which will then from its own weight naturally incline to resume its proper position; but we prevent the abdominal muscles, particularly the *recti*, contracting, and pulling the sternum towards the pelvis: or if, as it sometimes occurs, the sternum projects, the weight of the body will supply the place of artificial aid, and compress it. This action will also expand the ribs, and increase the cavity of the thorax.

If the patient is constantly kept in the facial recumbent position, the use of the limbs will return much quicker than in any other, for the paralysis resulting from the matter getting between the bones, and pressing on the membrane of the spinal chord would be removed, by its specific gravity causing it to fall downwards. The cause and pressure once removed from the theca vertebralis, the palsy would naturally cease.

The plan proposed by Mr. Verral has been tried at the hospital in some cases, with considerable success. Plate XIX. fig. 1. represents a patient now in the hospital under my care, placed upon the apparatus in the facial recumbent position. The inclined plane was made with some improvements, particularly adapted to hospitals; and consists in making the upper part of the plane movable, so as to admit of its being elongated to suit the different sizes of the patients who require it, and also to admit of extension, should it be considered prudent to employ it. Great benefit will result from the patient wearing some support attached to the body, to prevent the possibility of motion in the bones of the spine, when they are considered sufficiently recovered to move or walk. A firm thin splint has been found to answer the purpose, and beneficial results have been obtained from its being constantly worn, except when upon the inclined plane.

Plate XIX. Fig. 2. An improvement in Mr. Verral's inclined plane.

a. The inclined plane for the body to rest upon.

b b. Two arm-pieces to keep the trunk from slipping.

c. A movable frame for the purpose of elevating the legs when required.

d. An iron bar for the purpose of regulating the angle of the inclined plane.

e. The inclined plane for the legs to rest upon.

f. The foot-piece.

g. An iron screw.

h. The handle of the screw, which by turning acts upon the two arm-pieces, by which means extension can be made when considered advisable, or the arm-frames may be shifted to suit any patient.

The spinal reliever will be of service in some cases; and where it can be used with safety, it should be adopted, as the weight of the body will then be entirely removed from the spine; and it will be satisfactory to know, that while it is worn, the deformity cannot increase.

In the treatment of angular curvature it must be constantly remembered, that we are not enabled to restore the natural shape of the back in every case, and that there are very few instances indeed in which we can radically effect this desired end. But at the same time we have it in our power to prevent the deformity from increasing, and are often enabled to diminish the projection, and remove the unfavourable symptoms that urge the progress of the disease. It is much to be regretted that we are not consulted in the earlier stages of this deformity, as we could then almost invariably not only arrest its progress, but restore the trunk to its normal condition. I shall cite a case in point.

A person of the name of Horwood, residing in Oxford street, consulted me respecting her child, a boy about three years old, who was afflicted with angular projection: it had made its appearance about three months previous to my seeing him. I ordered him to be kept in the facial recumbent position, on a frame made after Mr. Verral's invention, with the improvements I have before alluded to: liq. potassæ, &c. were administered internally; and in the course of six months the projection was entirely removed. The treatment was persisted in a few months longer, for security sake, and the patient is now quite recovered, no trace of the projection, or weakness of the back being apparent.

I have added several cases to illustrate the advantages that may be derived from the different applications suggested, and the results will forcibly point out the difficulties we shall always have to encounter in long-standing and complicated cases of angular projection.

CASE.

Angular Projection, with the formation of Abscesses.

Henry Gibbs, aged seven years, became an out-

patient under my care in July, 1838, with angular projection of the lower dorsal vertebræ. The mother stated that she had observed the swelling gradually increase, and found that the child drew his legs after him; that he was languid, complained of being tired and weary, and his general health declined. He was ordered to be constantly kept in the recumbent position, and liq. potassæ was prescribed to be taken three times a day in milk, with small doses of hyd. c. creta. and pulv. rhei. occasionally, and a plaster was directed to be applied to the back. About a month afterwards, a swelling was observed on the left side, which gradually increased for twelve weeks; it was poulticed, and at length broke, and continued to discharge for a month: the child during this time completely lost his appetite, and was very weak. Milk diet was ordered; porter and tonics were given: under this treatment the abscess healed, the child's health and spirits improving daily.

This patient was kept in bed until the following summer, when he was allowed to walk about. The swelling in the back, however, soon reappeared, and the child got out of health and spirits. He was again ordered to be kept in bed, and in a short time another abscess appeared in the same

situation as the former. A poultice was applied to the back; milk diet, and a little porter—when the child could take it,—and tonic medicines were ordered: he was also allowed meat for his dinner. In a short time the abscess formed and broke; the discharge continuing as before for a time, then gradually decreasing till it healed: the boy got considerably better. In November, 1839, he was much improved both in health and spirits, and there was some difficulty in making him keep in bed: his mother had strict orders, however, not to let him get up.

October, 1840.—The boy has quite recovered.

This case serves to show that the continued discharge from an opened abscess is not always attended with unfavourable results, if we support the system. The next case will illustrate the benefit derived from the use of caustic issues, the patient being kept in a state of complete repose.

CASE.

Caries of the Lower Cervical and Upper Dorsal Vertebræ.

Louisa Allen, forty years of age, was admitted into the Middlesex Hospital the 29th of May, 1839, under

my care, with disease of the lower cervical and upper dorsal vertebræ. For twelve years previously she had experienced pain and weakness in the back between and above the shoulders, with violent headache, which was ascribed to, and treated as indigestion. She afterwards became subject to hysterical fits, which very frequently lasted for two hours. About a year prior to the time of her admission, she caught a severe cold, and her head was drawn down upon her chest, which ached and felt sore; and in walking, or using any exertion, she experienced much difficulty in breathing, with a numbness of both the upper and lower extremities. If she remained in any fixed position, her legs would contract; and while in that condition she suffered much pain, with a sensation as if they were asleep, but more violent. Her health had been excellent: she was married, and had two children. Issues were applied to each side of the spine, at the projecting part, near the last cervical vertebra, and small doses of blue-pill were ordered to be taken every night. As soon as the issues began to discharge, she felt great relief, and could then turn her head, which she could not do before; and in a short time she was enabled to sit, or stand erect. After she had been in the hospital between

two and three months, she was considerably relieved, and was made an out-patient; but owing to her residing out of town, did not very frequently attend.

In the early part of December she again came to the hospital, complaining of great difficulty of breathing. She stated, that when she bent her head forwards, she could not easily raise it again, and the vessels of the head became congested. She was, however, enabled to sit up, or stand erect, and the pains in the extremities had subsided. The sternum was found to be very much depressed; the space between it and the spine so inconsiderable, that when she bent forwards there must have been great compression on the upper part of the heart and large vessels immediately surrounding it. I advised her to become an in-patient at the hospital, but she declined, and I have not seen her since.

Remarks.

In this case the patient experienced very great relief by the application of the caustic issues; and although they did not stop the progress of the disease, they were of essential service in removing the pain in the chest, and the numbness in the extre-

mities. After she left the hospital, the deformity increased, and produced another result, by causing the chest to be very much contracted, and the contents compressed to a considerable degree, which, however, could have been in a great degree relieved by mechanical means, had she entered the hospital.

CASE. (Plate XX.)

Harriet Cox, ætat. eighteen, admitted March 18, 1840, under my care, at the Middlesex Hospital. Her statement was, that about a year ago she first observed a lump, as she called it, growing on the right side of her neck, which caused her pain and inconvenience. She then consulted a medical gentleman, who ordered a seton to be applied to the nape of the neck, and an issue to be made near it. Under this treatment the lump "slowly and "almost imperceptibly disappeared, she feeling at "the same time as though it were pushing the "head to one side." She was then attacked with rheumatic fever, for which appropriate remedies were prescribed, and setons, issues, &c. ordered for the curvature of the neck. On her admission to the hospital, she presented the following appearance. Her general health was bad, the system lan-

guid and emaciated; and the various secretions, &c. deranged. The neck was curved to such an extent on the left side, that the cheek almost touched the shoulder, and any attempt to raise it from that position caused the most excruciating agonies. I ordered issues to be made round the nape of the neck, the recumbent position to be kept, the head being on a level with the rest of the body, and a collar constructed of pasteboard, to be worn round the neck. Tonic medicines were prescribed, occasionally combining them with saline purgatives, as necessity required. Under this treatment the neck seemed gradually to be assuming its natural position, and the general health to improve: it was therefore still continued, the only part dispensed with being the pasteboard collar, which causing considerable pain, was obliged to be laid aside, and the dorsal recumbent position alone strictly enjoined.

Nov. 1840.—She is now nearly convalescent, her general health is improved, and the neck has nearly regained its proper position.

CASE.

Sarah Claxton, thirty-one years of age, was admitted into the Middlesex Hospital on the 28th of February,

1837, with angular projection, formed by the lower dorsal and upper lumbar vertebræ. She stated, that about eighteen months before her admission, she suffered from a pain in the back, which she attributed to a fall she experienced ten days before her confinement. The pain continued till within five weeks of her admission, when it was followed by a swelling, which rapidly increased. She then complained of severe pain in the thighs, and was unable to walk, the right one being principally affected: her health before the accident was very good, and catamania regular. Small doses of blue-pill, with Dover's powder, were ordered to be taken every night, and two issues were made, one on each side of the projection, from which she derived much benefit, and the pains in the thighs partially subsided. On the 23rd of May her health had improved, the pains in the back were less severe, and the legs and thighs completely free from it. A tumour was observed in the right inguinal region, accompanied with pain in the loins, and great heat down the right thigh. About a fortnight after this, there was fluctuation in the swelling, and as the issues had been allowed to heal, two others were applied, when the tumour in the groin gradually dispersed. Catamania now reappeared. She gradually conti-

nued to improve in every respect, her general health became better, and at her own request (having been nearly cured) she was discharged on the 4th of July.

Remarks.

In this case the benefit derived from the application of the issues was most striking; the pain in the back was relieved, and the aching and unpleasant sensation of the thighs subsided, in proportion as the issues continued to discharge. After they were allowed to heal, the swelling in the groin made its appearance, evidently being the commencement of the formation of an abscess, as I felt fluctuation. Great benefit followed the second application of the issues; the swelling disappeared, and the pains in the loins and thighs subsided, and she went on rapidly improving until her health was ultimately restored. No person, however opposed to the use of caustic issues, can conscientiously fail to admit the great benefit that followed their application in this case; and the case of Dinah Sarah Owens, related in the following pages, will also tend to point out the propriety of their use, and add additional weight to these observations.

Angular curvature may increase to so great an

extent, as nearly to form a right angle: at first only a small projection takes place, but by degrees it becomes very prominent and conspicuous, which will be pointed out in the following cases.

CASE. (Plate XXI.)

Complete Angular Projection of the upper Part of the Dorsal Vertebræ.

John Hatchard, twenty years of age, a cabinet-maker, residing at Windsor, was admitted into the hospital in January, 1835, with complete angular projection. He could scarcely walk, staggered much, and complained of want of breath. On examining the back, the spinous process of the third dorsal vertebra projected considerably. His statement was to this effect—that about two years previous he was carrying a load of furniture up a hill: the furniture was on a hand-barrow, which was carried by two men, with straps from the handles passed over the neck of each: he was the hindermost, so that in going up the hill the greatest weight was upon his shoulders, and required him to exert his strength to the utmost; it rained hard, and he was fearful of injuring the furniture. When he got up the hill, he heard something snap, and felt ill all over. He was unable

E. W. Dawson, del.

On Zinc by G. Schaaf

JOHN HATCHARD, AGED 20.

to work for a month after; still he had no definite ailment, but felt out of general health. He returned to work, but as he stooped his back ached very much, and his companions used to tell him he was growing round-shouldered. Shortly after, his mother observed a projection like a knuckle in his back, when she was brushing his coat, and in the course of the following week it had grown very discernible; one projection appearing at first, then two: this was about four months and a half after the first strain. He went to the dispensary at Windsor, but did not find much relief. About twelve months ago he was a patient in the hospital; but at that time the back did not project so much, he was not so weak, nor did he suffer much pain. His chest gradually began to project, and the ribs to be compressed; he had great difficulty in breathing, and felt such a tight and painful sensation, that the exertion of any sudden motion seemed to shake him to pieces. He stated, that previously to his being admitted he kept lolling about, but worked as long as he could: he found that his legs used to hang behind him, and drag along the ground when he used to walk with his crutches. He could now just walk, staggering much, complaining of want of breath. He remained in the hospital

for three months, and was then sent back to Windsor, as the confinement did not agree with his general health. During the time he was in the hospital, applications were applied to the back, and he was kept constantly at rest. When he returned to Windsor, he completely lost the use of his legs; was obliged to keep his bed, and live very well: but as he regained strength, the use of his legs slowly returned. At first he was able to crawl about the room on his hands and feet, and afterwards to walk a little by the assistance of two sticks. On the 23rd of February, 1836, he returned to the hospital, complaining of great weakness, and could only crawl by the assistance of a stick. The curvature formed a complete right angle, the spinous process of the third dorsal vertebra being the most projecting. The sternum protruded sharply, and the ribs were pressed sideways, but more so on the left than on the right. On the left side they were so compressed that the form of the lungs in a collapsed state might be seen, as well as its anterior edge. They were depressed towards the sternum, and elevated towards their centre, taking the complete form of the heart, the apex of it being pressed over to the right side. So distinct was its form,

that the pulsation of the cavities might be very easily felt, and in fact almost demonstrated. From this it would appear that the lung on the left side had given way to the pressure of the ribs, but that the heart would not yield, and by its pulsation had formed a cavity for itself. He complained of great difficulty of breathing, and at times the least exertion had the effect of nearly suffocating him. Warm plasters were applied to the back; and great attention paid to remove the difficulty of breathing, as it produced a very troublesome and unpleasant cough; which, however, yielded to the remedies administered. From an examination of the back it appeared, that the disease extended from about the sixth cervical to the sixth or seventh dorsal vertebra; the third dorsal spinous process forming the greatest projection, so that the bodies of several of the bones of the spine must have been in a state of caries. By the contraction of the flexor muscles of the trunk, the cervical vertebræ were drawn down towards the dorsal, and thus the angular projection of the third dorsal vertebra produced. This patient remained in the hospital until the middle of July, experiencing benefit from the treatment prescribed: he was now able to walk round the ward, and did not find near so much difficulty

in breathing; but his general health again began to suffer, and I therefore advised him to return to Windsor, which he did, and I have not heard of him since that time.

Remarks.

This case points out that a disease of the spine may continue for some time, and the patient be not aware of the cause of his sufferings; which in this case was eventually found out by the mother of the patient brushing his clothes. It shows, that by constant pressure the lungs yield to the shape of the chest, becoming collapsed, and therefore unable to perform the function of respiration, or the arterialization of the blood; thus illustrating the bad effects of compressing the chest by tight-lacing. The heart in this case was moved somewhat out of its proper position, and the ribs took the shape of that organ. I remember a case that was admitted into the hospital, (published in the Medical Gazette,) where the heart was completely removed from its situation on the left side, and pushed over to the right, by the wheel of a carriage running over the chest; it gradually recovered its natural position, without any bad symptoms occurring. The disease in Hatchard's case was very consider-

able; the bodies of several of the vertebræ must have been in a state of caries, and the support of the spine ceasing, the vertebræ above were pulled down by the contraction of the muscles of the abdomen. It also points out the advantage of rest in removing paralysis, and of good diet, as he gradually regained strength when he was at home, living upon the best he could procure.

The next case will point out the great extent that angular projection may acquire, and the benefit the patient will experience if the treatment is persevered in.

CASE. Plate (XXII.)

Complete Angular Projection at the lower part of the Dorsal Vertebræ.

Dinah Sarah Ovens, eleven years of age, was admitted into the hospital under my care on the 5th of March, 1839, with a very considerable angular projection at the lower part of the dorsal vertebræ. She complained of great pain in the back and sides, with loss of appetite. It appears, that in the winter of the year 1833, she fell down forty steps, and injured her elbow; three months afterwards she complained of great pain in her back, and on her

mother examining it, she found that it projected to about the size of her knuckle. She got her admitted into the hospital, under the care of Mr. Mayo; she was then cupped, blisters were applied, and afterwards issues were made. After remaining in the hospital for six weeks, she found much relief, and then went into the country. The projection continued to increase gradually, until it arrived at its present size, and the pain became very severe. The plan of treatment recommended was, repose in the recumbent position, warm plasters to the back, gentle aperient medicines, iodine, and generous diet. As she did not find much relief from this plan, two issues were applied near the projection in the beginning of April, which continued to discharge very freely; and the pain in her back gradually subsided, her appetite increased, her general health was considerably amended, and in a short time after she was able to quit the hospital.

These two cases point out the utter impossibility of improving the figure after the disease has been a long time in existence, nature having already deposited ossific matter for the union of the diseased parts by anchylosis; so that any attempt to straighten the spine would only increase the disease.

CASE. (Plate XXIII.)

Angular Projection of the Spine, with Inflammation of the Brain, the Spinal Sheath, and Marrow.

Edward Cunningham, nineteen years of age, was admitted into the hospital 1st of December, 1835, suffering from angular projection of the spine. He had applied to Dr. Harrison, but as he did not undertake gratuitous cases, he came to the hospital. He stated, that about two years previous he strained his back by jumping from the wall in Kensington Gardens. In about three months after this he felt a pain in his side, and weakness in his loins. Twelve months afterwards, Sir B. Brodie discovered a projection in the spine at about the sixth dorsal vertebra, and sent him to Margate, where he got rid of his pains. They however returned when he came back to London, and the projection in the back increased so much that he could only walk with the assistance of a stick. Tonic medicines were prescribed, and rest advised. In January, 1836, his left leg first became very weak, and then entirely useless; and in three weeks after his right limb also became paralyzed, but with only partial loss of sensation in either. An issue was

made on each side of the projecting vertebra, and the legs were ordered to be rubbed frequently during the day. After the sloughs had come out of the issues, sensation increased, but without the power of volition. If his legs were moved it was followed by a spasmodic action that occasionally caused them to start and jump involuntarily. His general health was good, and had always been so. The tonic medicines were discontinued after a short time, and he was ordered mild aperients, milk diet, and leeches were occasionally applied to the spine. In the latter end of January the legs became very hot and stiff, causing great pain; he felt as if he had the power of volition in them, without really possessing it. They were ordered to be frequently rubbed with linimentum saponis, with tinct. lyttæ.

At the end of February he could move them a little, but complained of his sides being very sore: he was anxious to get up, and on the following day I found him sitting up with pillows placed behind him: he was desired not to remain in the sitting position, but to return to his bed as soon as possible.

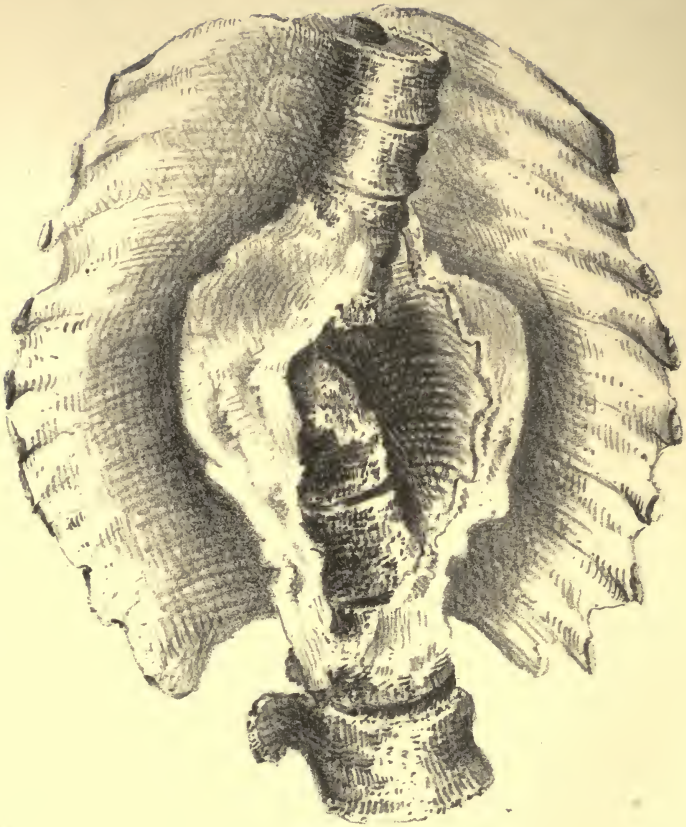
Early in March he began to complain of much pain in the abdomen, extreme weakness, and ap-

peared very low; some slight tonics were administered, and mustard-poultices were applied to the pit of the stomach for about twenty minutes at a time: the pain subsided some days afterwards. At the end of the month little alteration was observed in his limbs; his sides on pressure were very sore, and his bowels irregular. He was ordered blue-pill with rhubarb every night, and a draught of infusion of gentian with senna every morning. At the end of April a slight improvement was found to have taken place; he had more sensation in his legs, and there was a slight amelioration in his general health. By the middle of June the pain in his legs was much increased, and the embrocation was continued; but his health was not so good; bowels still irregular.

July 12.—He was ordered to be electrified, and seemed to derive benefit from it. On exciting the muscles of the legs, as by kneading them, they twittered and trembled for some time. He continued gradually to improve until the 18th of November, when he complained of great pain in one particular spot in the back, about the centre of the projecting spinous process, and the pain seemed to him to feel as if it ran through to the fore part

of the body; he then completely lost the use of his legs. He had rigors previously, which lasted about a quarter of an hour: he was very thirsty, and there was considerable heat of the skin. These symptoms continued to increase; he then began to complain of great pain running up the spine, all over the head, which gradually increased, the heat of skin became greater, the pulse very quick. He was delirious for a few days, and then became insensible, in which state he remained a day or two, when he gradually sunk, and died on the first day of December, 1836, just twelve months after his admission into the hospital.

The body was examined on the following day, when an abscess was discovered on the fore part of the projecting bone of the spine, which had burst towards the spinal canal, and the matter pressed against the sheath of the spinal marrow. Inflammation had taken place in the coverings of the spinal marrow and the spinal chord itself; and had continued up the spine to the coverings of the brain, which were affected by it. The brain itself was also inflamed, and there was serum found beneath the coverings of the spinal chord, and the brain had fluid in its cavities. The accompany-



From Nature & on Zinc by H.F. Coles.

ing plate is taken from the preparation of the abscess, which is in the Museum of the Hospital.*

Remarks.

From the various cases that I have seen of caries of the spine, I believe that the application of issues is of the greatest advantage to prevent the formation of abscesses. In this case they were applied at first, then allowed to heal: but were not persevered in, and other remedies employed. I cannot help conceiving that had more issues been applied, and kept open for some time, the mischief would have been considerably lessened, and perhaps in a great measure prevented; but of course this was not then my opinion, or they would have been ordered.

CASE.

Scrofulous Affection of the Spine, with Angular Projection.

John Copson, three years old, was brought to

* Plate XXIV. is a representation of the preparation of the abscess, now in the Museum of the Hospital, where the anterior wall of the abscess may be observed, and the situation where it broke towards the spinal canal seen.

CASE. (Plate XXV.)

Angular Projection of the Spine, with Scrofula.

William Tray, fifteen years of age, was admitted into the hospital March 15, 1836, with angular projection of the spine. He stated, that about five or six years previous, his father had him in his arms in a hayloft, and dropped him into a cart full of corn, supposing that he would not be hurt; when he fell into it, his foot slipped, and he fell upon the ground, a distance of about ten or twelve feet: he then felt a pain across the bottom of his loins, which, however, gradually diminished. About two years after his fall his mother discovered a swelling on his back, and went to Sir Astley Cooper, who drew the form of an instrument for his back, for the purpose of supporting it on each side, with a hole cut out for the projecting part, but he neglected to procure it, and went to work at the china and glass business. He soon found the swelling in the back increase, and within the last three months he had had very great pain in his legs. He went to a Dispensary, where two caustic issues were applied to his back, which were kept open for

E. W. Tinson. del.

On Zinc by Gearhart

WILLIAM TRAY Aged 15.

three weeks; but he found no relief, and he was advised to come to the hospital. On examining the back, the projecting spinous process appeared to be at about the eighth or ninth dorsal vertebra; on the right side, a projection of the ribs appeared, but on the left, they were much depressed; and when pressure was applied upon the part, he complained of much pain and an uneasy sensation internally. The treatment followed was constant rest in the dorsal recumbent position, and leeches were applied whenever he felt an increase of pain in the back. He was ordered to take tincture of iodine in an infusion of orange-peel three times in the day; under which treatment he improved. In the following month (April) after his admission, he stated, that when he held his leg up for a short time, it shook very much, but that he did not experience this without he used the exertion of holding it up. A very light, well-padded deal splint was ordered to be made for him, and it was placed in front of the body, and attached to it by flannel rollers. This, after a short time, afforded him much relief and support, as he could move about with greater ease. He continued to improve both in strength and general health up to the time of his discharge from the hospital, which was in May, 1837,

having been in the house upwards of fourteen months, and was able to walk with great ease.

Remarks.

The disease in this case was attended with scrofula, which had been brought into action by the fall the patient experienced six years antecedent to the time of his admission: the little success attendant on the application of the issues being thus accounted for. Rest, and the administration of iodine, &c. internally, produced the favourable symptoms already noticed.

CASE.

Disease of the Spine, with Psoas Abscess.

Frederick Terry, three years of age, was admitted into the hospital on the 9th of May, 1837. His mother stated that he had hooping-cough about three months previous, and about a month afterwards she perceived a slight curvature in the spine, and soon after an abscess commenced forming. Active measures were resorted to, to prevent the abscess breaking. To effect this, issues were applied in the lumbar region, and under this treatment he at first improved; the abscess got smaller, and his

health mended: he was ordered steel-wine three times a day, and milk diet. The issues were then healed up, as it was thought they had been of sufficient service, and that the abscess would not break. He then became worse, got out of health, had occasional shivering fits, and the abscess became larger. Issues were then ordered to be applied again, but with less benefit than at first. The abscess gradually became larger, and at last pointed on the inner part of the tuber ischii, when it was opened by a valvular incision, and then allowed to heal up. It was afterwards opened several times, and the child got a great deal better: but the mother persisted in taking him out of the hospital, which she did on the 12th of September. I then cautioned her respecting the treatment of the child, and wished her to let me know how he went on, but she neglected to do so, and the poor child having no medical care, died a few months after he left the hospital.

Remarks.

In this case much benefit was derived from the application of the issues, which decreased the size of the abscess as the discharge from them was encouraged; although their application was not suffi-

cient to prevent the abscess from increasing, so that it became necessary to open it. It had nearly healed when the child was taken from the hospital; and had he been allowed to remain, or been properly attended as an out-patient, I do believe that a cure would have been accomplished.

SPINA BIFIDA.

This abnormal condition of the spine is owing to a collection of fluid in the sheath of the spinal marrow, pointing between the vertebræ at its dorsal aspect. It is one of those malformations of the body which occasionally presents itself to our notice, and consists of a swelling that is generally situated in the loins, but will sometimes be found at the back of the sacrum; the dorsal, or even of the cervical vertebræ. The swelling has an elastic feel, and has been supposed by several men of eminence to arise from serum at first situated in the ventricles of the brain. This fluid is supposed to pass from the lateral ventricles into the third, and from it through the iter a tertio ad quartum ventriculum to the fourth ventricle, from whence it descends into the theca of the spinal marrow; and ultimately causes a swelling between the transverse processes of the vertebræ at the situation of the spinous processes.

The dura mater at this part becomes elongated, adheres to the skin, and forms the sac or cyst of the tumor on the outer surface. In all cases of this malformation of the spine that have ever been examined, there has been a deficiency in one or more of the spinous processes, the tumor occupying their place; but I am not aware that this has been accounted for, although the cause of the swellings has been explained.

On referring back to what I have stated (page 7) on the anatomical formation and structure of the vertebral column, we shall find that the spinous processes of the vertebræ are the last part of those bones that become ossified. In the fœtus they are entirely wanting, and even at the time of birth are only to be distinguished by a cartilaginous portion in the situation in which they are ultimately to be developed. If then it is an established fact, that this disease always occupies the seat of the spinous processes of the vertebræ which are then wanting, I should be inclined to adopt the following hypothesis to account for it—That when a sufficient quantity of the fluid has accumulated, and by its specific gravity caused an elongation of the dura mater to form a cyst for its reception at any part of the spine, the pressure produced by the coats

of the sac on the cartilaginous part of the unossified spinous processes, absorb them; or, if occurring at an earlier period of gestation, prevent their formation. Experience will in a great measure bear out this theory; for in all post-mortem examinations, the spinous processes have been wanting; and I am not aware of any case on record where a cure has been effected, and the spine made perfect. Nor can we admit—from the early age at which patients thus affected die—the supposition that the vertebræ ever arrived to a proper degree of ossification. The fact of the disease appearing in the situation of all the spinous processes indiscriminately, will lead us to infer that the fluid will collect where it finds the least resistance from the surrounding parts; though forming more generally at its lower extremity would naturally result from the specific gravity of the fluid. We shall find an analogous case in furtherance of our argument in the formation of the second set of teeth; with this exception, however, that the one is a diseased condition of the spine, whilst the other is a natural effect of nature, though they both produce the same effect. When the rudiments of the second teeth are sufficiently advanced, the pressure of the sac which contains

the pulp, causes absorption not only of the cancellated structure of the bone—that forms the laminæ which separates them from the first set—but also the fangs of the first teeth themselves: thus showing that the softer part which can yield to pressure will not become absorbed so soon as the harder substance which cannot; since the process of waste or absorption then increases at the same ratio that renovation decreases.

This disease is one of the most formidable that I have mentioned in this work, and many cases have occurred where the child has lingered until the second or third year, which have been incurable; but Sir Astley Cooper, Bell, Abernethy, Earle, &c. have each recommended plans of treatment. Pressure has been applied to the swelling;—it has been punctured repeatedly, when the swelling has gradually been found to subside: convulsions will, however, sometimes follow after puncturing the tumor. I have seen about ten cases of this disease in the course of my practice, and all the patients have died. In one or two nothing was done to relieve the swelling; in a few pressure was applied, and in the others the tumor was punctured. This latter plan I am induced to believe is the best to adopt; but at the same time in spina

bifida, as in hydrocephalus, there are but few cases that have proved successful. The removal of the tumor has been mentioned to me, but I have never seen it done: it has been named as being a successful mode of treatment, but until I have been able to judge from experience, I will not venture to recommend it. I would advise those who are desirous of further information on this subject to consult the authors that I have already named as treating of this division of the affections of the spine; as the limits of these pages will not allow me to dwell longer on it.

A case of spina bifida has been related to me in a female twenty-one or twenty-two years old, where nothing had been done. The patient was recommended to have a tin case made to hold the tumor, and to protect it from external pressure and violence. This is the only person that I have heard of, who arrived at such an age with this malformation.

LUMBAR OR PSOAS ABSCESS,

AND ABSCESSES CAUSED BY DISEASE OF SOME OF THE VERTEBRÆ.

Lumbar or psoas abscess is very frequently seen, particularly in hospital practice, the effect of the two being produced from the same cause, viz. a diseased state of the lumbar vertebræ: but it has been doubted whether the disease in the vertebræ is the primary result, or produced by the collection of matter coming in contact with these bones. This is very probable, but still the prevailing opinion, and perhaps the more correct one, is, that the disease is in the bones themselves, or rather in the surface of the lumbar vertebræ. The term lumbar abscess was formerly applied when the collection of matter pointed in the lumbar region behind the abdominal viscera; but this term is now applied to all cases, whether the matter points in this region, or in the walls of the abdomen, or even at the inner part of the tuber ischii. The term psoas abscess has been

used when the matter points below Poupart's ligament, in the sheath of the psoas magnus muscle; but in all such cases the original cause of the matter is diseased bone, or caries of the bodies of the lumbar vertebræ, and therefore, wherever the matter points, they still may be considered as one affection.

The diseased condition of the vertebræ in these cases may be the result of accidental sprains or blows; of considerable exertion of the lumbar vertebræ; of exposure of the body to cold and damp; or produced by carrying too heavy loads, or from constitutional causes, occasioned by a debilitated or scrofulous habit of body.

This affection is characterised by unremitting pains in the loins, which are increased by exercise, but diminished by repose. From want of attention in many cases, a tumor makes its appearance in either of the situations before enumerated. If the matter points at the insertion of the psoas magnus muscle, and has been of some standing, the complaint may be more easily detected by desiring the patient when in the recumbent position to attempt to elevate his thigh, which he will be unable to do, on account of there being no firm attachment for the psoas muscle, and also on account of the action of

that muscle being weakened by its sheath containing matter.

These cases are generally unattended with deformity, notwithstanding the cause of their appearance, although sometimes they increase to such an extent as to produce distortion of the greater portion of the bodies of the vertebræ, causing different degrees of deformity, according to the number and the extent of the disease in the bones. The affection is then denominated angular projection.

The symptoms that accompany lumbar abscess vary much in their effects upon the general health; in some cases the patient suffers very considerably, whereas in others the inconvenience is but trifling; but when the disease has acquired an ascendancy, the patient suffers from weakness, hectic fever, great pain, restlessness, want of appetite, profuse perspirations, and general derangement of the constitution.

Permanent recumbency during the continuance of the disease is essentially necessary; for exercise, or any motion of the bones or intervertebral substance, will—as in an ulcer over any joint, where, if any action is allowed, it cannot heal, on account of the granulations being constantly disturbed—irritate the caries, and interrupt the process of nature in

effecting a cure, which is to be performed through the medium of anchylosis, as I have before explained, when treating of angular projection.

Rest then will be required to assist nature in the relief of this affection: but this is not all; the constitutional symptoms must be likewise carefully watched. The hectic fever, which usually accompanies this disease, may be owing to the collection of matter requiring an exit, and will be sometimes relieved by allowing it to escape; and the best plan of effecting this is by a valvular opening. If the discharge points in the groin below Poupart's ligament, at the insertion of the psoas muscle, the skin may be drawn on either side, and the point of a lancet introduced, making only a small aperture; and after the discharge has been allowed to drain off, the edges of the wound ought to be drawn close together, and kept so by adhesive plaster. A small compress may then be applied over the plaster, and kept there by a roller; the object being to close the wound, and induce it to heal by the first intention.

In this manner a psoas abscess may be opened several times, the patient being constantly kept in the recumbent position. This plan is recommended under the impression that every time an abscess is

opened it gradually contracts on each occasion, and thus produces a tendency to a cure, by becoming smaller by degrees.

Tonic and other medicines are of much benefit in lumbar abscesses, as there is constantly a drain upon the constitution by the continual discharge. Nature therefore requires support to enable her to keep up sufficient strength to bear such debilitating effects. Sometimes the patient suffers from diarrhœa, resulting from the exhibition of the medicines; they should therefore be occasionally varied, as the symptoms require, otherwise the strength of the patient will very soon suffer from its continuance, and may gradually sink under the attack.

The diet should be good and nourishing; malt liquor and wine will in some cases be necessary; fresh air is indispensable. The constitution has very often to bear up against this disease for several months, and too much care cannot be paid to every trivial circumstance that can in any way increase or promote the strength of the patient. The mind should be amused by all the means in our power; for it must be recollected that this is a wearisome and tedious disease; that the patient is apt to become irritable and fretful from want of rest—

lingering pain—the necessity of keeping always in one position, or even the tardiness of the disorder. It becomes the duty of the attendant to bear this, and to try and soothe the patient, avoiding on all occasions to excite this irritability, which would only tend to retard the cure and increase their sufferings.

Artificial support in some cases will do good, particularly where this disease is gradually advancing towards a cure. Strengthening plasters applied along the whole course of the spine, and two splints properly padded and placed on each side of the vertebræ—being fixed on by flannel rollers—will give a degree of support to the back, and enable the patient to move more freely in bed, and to sit up sooner than they otherwise might do. But this plan must not be attempted too early, for the motion necessarily employed by the application of the roller might, if the cure had not sufficiently advanced, create fresh mischief, and thus retard the cure.

Sometimes, after the disease has completely subsided, the pain has ceased, and the patient is apparently well, a relapse may occur, and fresh confinement be the consequence: but this may be

prevented by the aid of the support already recommended.

Abscesses may occur from caries of some other vertebræ besides the lumbar, and the matter point in various situations. In these cases rest, and the remarks before stated, will, by being pursued, lead to the recovery of the case, except indeed it be one of a very serious character.

Lumbar abscess, or abscess caused by caries of any of the bones of the spine increasing, on account of the patient using exercise, or attending their usual avocations, may end in deformity, by the caries destroying the body of one or more of the bones of the spine, which by sinking down will cause angular projection. In such cases palsy will often intervene, the treatment of which has been described, and may be referred to under angular projection of the spine.

Lumbar abscess sometimes progresses very rapidly, occupying the whole of the space between the last rib and the crest of the ilium, descending even lower than that part of the bone, and by burrowing beneath the muscles, occasioning the bones of the pelvis to become diseased. In such cases, great caution should be taken, if the ab

scess is opened, to prevent its external wall from sloughing, which occasionally takes place, and a very extensive wound is produced, which soon terminates in dissolution. These cases are more formidable in middle-aged patients than in youths, for in the latter the constitution has more strength to bear up against the disease. Caries of the spine sometimes occurs at a later period of life, and may attack various parts of it, particularly in such constitutions as have been impaired in youth by disease and dissipation, and where the body has not been sufficiently guarded from the inclemency of the weather. The cervical, dorsal, or lumbar vertebræ may be the seat of the disease, and these cases will require the strictest attention, or otherwise the destructive process will progress very rapidly, and angular projection of that part of the spine be produced. Several of these cases have come under my notice, and one in particular, where the patient would not follow the plan recommended, so that I was obliged to decline my services. He soon afterwards fell a victim to the disease, although the cure of the case had been promised by the practitioner under whose care he had placed himself. The seat of the caries was in the cervical verte-

bræ, and the patient's head rested at last upon the fore part of the chest: the symptoms were severe, and he must have suffered very considerably before his death.

Issues in many cases of lumbar abscess are absolutely necessary, and will, if applied at a proper time, and kept open sufficiently long, very frequently prevent the collection of matter; and even after it has formed, often cause it to disperse. But when the disease is of a scrofulous nature, they will only do mischief, as I have before pointed out. The aching pain, and constant numbness in the loins, so often felt at the commencement of the disorder, may be frequently relieved by the application of blisters, which when healed may be repeated until a beneficial effect is produced. Opiates in these cases may be of much service, by inducing sleep, which will recruit the strength and spirits, and invigorate the frame.

In a disease of such a character as lumbar abscess, where the patient is daily suffering from the permanent recumbent position, so necessary to establish a cure; and also from the distressing symptoms already related, too much care and attention cannot possibly be bestowed on any means,

however trifling, that can in any way relieve them; for it must ever be borne in mind, that the alleviation of mental suffering must always operate advantageously in accelerating the cure of bodily affections.

CHRONIC INFLAMMATION OF THE CANCELLATED STRUCTURE OF THE VERTEBRÆ, INTERVERTEBRAL SUBSTANCE, OR SURROUNDING MEMBRANE.

The spine is equally subject with other parts of the body to inflammatory action, from similar causes, as strains, over-action, cold, external violence, and constitutional affections; and when it has once commenced, it will continue for some time, owing to the least action of the spine, caused by the movement of the different parts of the body, producing and exciting its tendency, and I have therefore named this affection of the spine chronic inflammation.

It has been mentioned that the vertebræ in their internal structure are extremely cancellated, and of a vascular texture, and any increase in the circulation of this part will induce inflammation. The ligaments covering the spinal column

are also extremely vascular, and the vessels supplying both, freely communicate, so that when any exciting action is set up in the structure of either, it may continue for some length of time, and vary considerably in its activity, relatively to its producing cause. We may observe an example of this in cases where the ligaments are strained by some sudden or powerful exertion. This brings on an inflammatory action, in which the cancellated structure of the bones participates, by reason of the free communication of the vessels of these two parts. If any of my professional readers doubt the accuracy of this statement, let him take any of the vertebræ in his hand, and I request him to examine the lateral and anterior part of its body, and he will perceive numerous foramina, which are for the passage of the vessels alluded to, and which produce the effect already mentioned.

The inflammatory action having commenced, it may continue a long time, by the constant motion of the spine, until at length pressure takes place against the spinal marrow, from the swellings of the membrane reflected over the bone, and produces paralysis of all the parts below it: or the inflammation being of a chronic form, the bones may become soft, and yield under the weight

thrown upon the spine. This state of the vertebræ may or may not cause deformity, and will result from cold, over-action or injury, or the causes which produce inflammation generally. The treatment ought in most cases to be the same as the plan followed in inflammation, but rest is very essential for the relief of this affection.

Leeches, cupping, counter-irritation, may all be of service in effecting a cure. I have seen many patients suffering under this affection, both in an acute and chronic form. In the former, a cure has been accomplished by leeches, cupping, warm fomentations, warm plasters, flannel rollers, together with medicinal treatment. In the latter, blisters, issues, friction, with rubifacients, rest, plasters, and rollers, together with the application of splints, have been successfully applied.

There are some cases which will not yield to these remedies, and therefore require another plan of treatment. Rest in these more obstinate cases will prove of the greatest use: exercise, however gentle, may produce bad consequences, and even numbness of the extremities, and palsy. Rest will generally restore the use of the limbs, but blisters may be found useful. In some of these cases the recumbent position is the only safe one for

the patient, as all weight of the body is then taken from the spine. The unfavourable symptoms may be owing to inflammatory action, caused by exercise: or by increased circulation, tending to thicken the surrounding membrane, and producing pressure against the spinal marrow. Now that part of the spine being unequal, even after rest, to fulfil its purpose, namely, to support the body, rest alone could not be successful, as happens in other cases of curvature, particularly lateral, arising from a debilitated state of the vertebral column. In cases of inflammatory action of the spine and surrounding membrane, some caution is requisite, or otherwise it may terminate in suppuration, and cause the bones to become in a state of caries, when deformity will be produced. The same result may occur if the bones become so soft, that even when the weight of the body is removed from the spine, the action of the muscles by their contraction may still occasion distortion.

Where the palsy is owing to pressure, the administration of blue-pill every night will be of service, by producing absorption. Where patients have complained of numbness of the legs, or other parts of the body, this medicine has been found of great benefit. When all pain in the back has sub-

sided, and the strength of the patient will permit, the spinal supporter will be beneficial, and enable him to sit up. It should be so made, that when the patient is upon a chair, (and one with a wooden seat will be the best,) the whole weight of the body should rest upon it, and not the slightest part be allowed to remain on the spine. This supporter should be bound on while the patient is in the recumbent position, and then two persons, one on each side, should raise him up, and gradually place him in the chair. The legs may be moved, which will strengthen their muscles. When the patient has acquired sufficient strength to sit up for some hours during the day, he may be placed upon his feet in the erect position by two assistants, and allowed to stand for a short time, the assistants carefully replacing him again in the chair. Walking a few steps may afterwards be attempted between the two assistants, and this may be increased with the aid of sticks, until the patient shall by degrees become sufficiently strong to walk without any assistance.

During this time the progress of the case must be carefully watched by the surgeon, who will regulate his course by the symptoms that present themselves. A steady perseverance in this treatment, with

From Nature & on Zinc by G. Scharf.

CHARLES BLOSS.

proper caution, will in all probability lead to the recovery of the patient, as will appear in the following case.

CASE.

Charles Bloss, twenty-six years of age, a groom in the service of His Grace the Duke of Dorset, was admitted into the Middlesex Hospital, June 18, 1839, with spinal complaint, which had obliged him to recline on his back for the last five years. He made the following statement of his case. "In August, "1832, I was taken with a violent cold, fullness "and soreness of the body, and indigestion. The "first five weeks I was attended by Mr. Horton of "Newmarket, during which time I took a great "deal of opening medicines, lost two stone in "weight, and became dreadfully weak and nervous. "As I found myself worse every day, I wished to "have further advice. I then went to Dr. Probart "of Bury St. Edmund's, who said I was suffering "from indigestion, and that my stomach was dis-"tended. I had a pain in my side, which he at-"tributed to the same cause. He prescribed "strengthening medicines, an issue at the pit of "the stomach, and strong exercise. My diet was

" dry biscuits, mutton, game, and fowl, and weak " brandy-and-water. I was under Dr. Probart's " care for about three months, by which time my " general health was quite re-established, though I " had not entirely lost the soreness at my stomach, " and if I attempted to lift or draw the least weight, I " used to turn very faint, so that I had scarcely " strength to sit upright, but by taking a walk it " would soon pass off. It was some time in " January, 1833, I fancied I hurt my back dancing. " It appeared like the prick of a pin, became very " stiff, and the following day I had a good deal " more pain. I was never able to bend my spine " afterwards. I had two or three blisters on at dif- " ferent times, from which I found relief; and " whilst I remained perfectly quiet, I seemed to get " better, but the least exertion threw me back " again.

" I came to London the 20th of February, 1834, " and saw Mr. Copland. He said I had strained " the muscles of my body, which had caused a " weakness in the cartilages of the spine; advised " me to return home, to lie constantly on a couch, " to be blistered the whole length of the spine, and " repeat the blisters if I did not get better: they " were repeated, and as I had a great deal more

" pain, Mr. Copland wished me to continue " lying, and to have an issue on each side the spine. " I had a violent aching in my back and legs, which " continued two or three months: it then gradually " grew less, and at the end of six months I seldom " felt any pain, except when the hair of the mat- " tress had got so displaced that I had not an " even pressure, which would very much affect my " back and pit of the stomach. I kept my bed " nine months, and got up the 1st of December, " 1834, which I continued to do till the latter end " of October, 1835; but as I had great difficulty " to sit comfortably, and made no progress, Mr. C. " wished me to resume the recumbent position, " which I did for two years and three months. I " then took strychnine, which I thought did me " good; but I was still unable to lift my legs from " the bed, though I could draw them up; and even " talking fatigued me very much. However, I " began to rise again in February, 1838, and ap- " peared to be getting on very nicely; but I am " afraid I was too anxious, and over-exerted myself, " for after a trial of seven weeks, I was obliged to " return to my bed, where I continued till I came " to London, and was admitted into the hospital."

I examined the spine, and found very little de-

formity or irregularity, either in tracing the spinous processes, or running the hand down the situation of the transverse processes. There was a degree of fullness in the lower part of the dorsal, that extended as far as the two upper lumbar vertebræ, and this was the situation where he described his pain to be seated; and even at this time it was tender when pressed very hard. He had not been able to do anything for five years, and had been out of health since August, 1832. He was very anxious to get up, but every attempt to do so only made him much worse. The plan of treatment I pursued was tonic medicines, with support to the back. The spinal supporter was made for him, which took all the weight from the spine, and threw it upon the chair on which he was seated. The support consisted of two steel uprights, one on each side, extending the whole length from the lower part of the tuber ischii to the armpits. These were fastened below by a steel spring, which was fixed round the pelvis: the instrument was firmly laced round the body, and he felt much support from it. At first he was allowed to sit up upon a chair by the side of his bed for a quarter of an hour, and the time was daily increased five minutes, provided he felt no inconvenience from it,

or from the pressure of the instrument: he continued this plan for some time, until he was enabled to sit up for three hours daily. The instrument was elongated about a quarter of an inch, as the length of the spine increased. He gained strength every day; the muscles improved in size, particularly those of the leg; and he persevered in this plan, under my inspection, with little interruption, excepting for about ten days, when a cold confined him to his bed.

In the October after his admission, the time of remaining up had been increased to nearly seven hours: he could sit at his desk and read. He exercised his legs by drawing them up, and moving them in different directions, so as to bring the different muscles into action; and was in the early part of November improving so rapidly, that I looked forward to his being able, in a short time, to walk about the ward: but I was very cautious how I allowed him to use exercise, lest any sudden exertion should oblige him to resume the recumbent position. I felt convinced that by continuing carefully this treatment, a perfect cure would be accomplished. On the 28th of November, he was up for seven hours and a half, and he found himself very strong, and not the least inconvenienced by it.

He was directed to place two chairs, one on each side of him, to raise himself up, by placing one hand on the back of each chair, and to stand a few minutes at a time; and to do this once or twice during the day. He could not use crutches, on account of their disturbing the situation of the instrument he constantly wore, otherwise they would have been recommended to get him upon his feet. He could not raise himself from the chair upon his legs without the assistance of two men, but with their aid he accomplished this, and stood at first only for a few minutes, increasing the time every day. He found that he gradually gained strength, and was, with such assistance, enabled to walk a little in the ward. I advised him to increase the distance every day, and by this mode the assistance he required became daily less, until at last he could walk with the assistance of two sticks. The time occupied in this exercise increased from twenty minutes to half an hour, twice a day. This patient gradually continued to improve, and at the end of the following April he was able to walk quite well, without the use of sticks, or any other assistance. He could not raise himself out of the chair alone, but this difficulty was soon overcome by raising the height of the chair, and he very rapidly regained

his health and strength; with every reason to expect that he would shortly quit the hospital, a perfect cure having been effected.

I kept this patient, whose case was full of interest, in the hospital until September, 1840, that I might have him under my own immediate superintendence. He was then discharged, and went to his family at Newmarket, from whence I received a letter from him, dated October 23, 1840, wherein he gives me the very satisfactory intelligence, that "he is still going on well, and gradually "gaining strength; takes three or four hours' exer- "cise in the course of the day, and has a very good "appetite." It will thus appear, that the treatment was successful, and that my anticipations of his restoration to health were well founded.

Remarks.

The inflammation in the spinal column and surrounding membranes, in this case, resulted from the sudden exertion of the muscles of the back whilst dancing; causing an inability to move, which each effort increased, and promoted the inflammatory disposition in the bones of the spine. I am induced to believe, that had not the pain and loss of power in the legs obliged the patient to seek the recumbent position; or had he been obliged to move

about, (the loss of power not being so severe,) that deformity would have appeared, on account of the bones and cartilages yielding to the weight they could not support; but that owing to the loss of power compelling the patient to keep the recumbent position, any irregularity in the figure was prevented.

I am also disposed to think, that had the plans recommended (of artificial support) been adopted when the patient was first allowed to sit up, it would have proved successful, since the pain and the loss of volition in the limbs, resulted from a return of the inflammatory action, caused either by the motion of the spine, thickening the membranes of the vertebral column, and producing pressure against the spinal marrow: or from a softened condition of the intervertebral substance, allowing the bodies of the vertebræ to approach nearer to each other; which would shorten the length of the spine, and consequently contract and compress the spinal marrow.

When the spinal supporter was applied, the back was kept perfectly free from any motion, and relieved from all weight; it also tended to elongate the vertebral column, by straightening the bones, and preventing pressure upon the intervertebral substance. It was the want of such support that had

previously obliged him to maintain the recumbent position.

Inflammation of the spinal column and surrounding membrane may also result from external injury, caused by a blow or fall; and although the symptoms are more severe, a speedier cure may be effected by active treatment. The following interesting case will illustrate this observation.

CASE.

Harriet Tillet, twenty-seven years of age, of a plethoric habit of body, was admitted into the Middlesex Hospital, under my care, on the 10th of January, 1838, having fallen down some steps and injured the spine about the lumbar vertebræ. She complained of much pain upon pressure from the last dorsal to the fourth lumbar vertebra, and of an aching character. I ordered sixteen ounces of blood to be taken by cupping, and an active aperient to be administered. The following day she continued much in the same state, but there was more heat of skin; the tongue was white and furred, the pulse sharp and quick: the cupping had not relieved the pain in the loins; the bowels, however, had been freely evacuated. She was then ordered

to take cal. gr. ij. pulv. antimon. gr. iij. every six hours.

January 12*th.*—The pain in the seat of the lumbar vertebræ was very severe: the heat of skin had increased; tongue more furred, pulse quick and full, and more tenderness in the loins. Upon passing the hands over the lumbar vertebræ, she could hardly bear me to touch the spinous process. Twelve ounces of blood were taken away by the cupping-glasses: rep. the cal. and ant. Haust. salin. ℥ij. cum liq. antim. tart. m. xxv. ter.

13*th.*—Little amendment was visible; perhaps the pain had somewhat abated: the other symptoms were as yesterday.

14*th.*—The pain in the back was more severe to-day, the pulse less frequent, the bowels open, tongue less furred. The medicine to be repeated.

16*th.*—She remained much in the same state as when I last visited her; the pain in the loins and the other symptoms continued.

20*th.*—Since the last statement this patient had not improved: this morning she complained of more pain in the loins, which had deprived her of sleep: the pulse was somewhat quicker, and there was more heat of skin. She

was ordered to be cupped again, and ten ounces of blood to be taken.

22*nd*.—The pain was somewhat relieved by the cupping: there was evidently inflammation going on in the lumbar vertebræ and surrounding membranes; the places where the cupping-glasses were applied looked angry, and were very painful when touched.

25*th*.—The patient suffered much from pain, but of a different character, there being little pain in the seat of the lumbar vertebræ as before, but more superficial pain where the cupping-glasses had been applied, which had all the appearance of sloughing: there was less heat of skin, and slight fever.

28*th*.—The symptoms unabated; sloughing had commenced where the cupping-glasses were applied.

February 2*nd*.—The pain in the back was very severe. She complained of considerable numbness of the legs; the tongue was furred, the skin hot: the sloughs were coming away from the back. Calomel and antimony to be taken every eight hours.

5*th*.—She had more numbness in the legs; the other symptoms were the same.

8*th*.—The legs became nearly paralysed: the

pulse was lower; the skin not so hot, nor the tongue so much furred.

12*th.*—This patient quite lost the use of her legs: she had occasionally delirium: the sloughs came away. Poultices were applied to the ulcerated surfaces; the calomel and antimony continued.

16*th.*—The symptoms were the same.

20*th.*—There was some little improvement in the legs, there being a little motion in them; the ulcerated surfaces looked healthy.

25*th.*—There was some amendment; the legs had gained more motion, and the patient was altogether better.

March 1*st.*—The improvement continued: she was gradually gaining more command over the legs, and she seemed much better.

6*th.*—The ulcerated surfaces were healing, the legs gaining more power, and general amendment took place. From this period she gradually continued to improve; the ulcers healed, and she gained sufficient power to walk round the bed; she used more exercise each day, until she was able to walk across the ward, and on the 1st of May she left the hospital, nearly recovered. During the time she was an out-patient, her health became completely restored, and she remained quite well

until the early part of November, when she complained of want of power over her legs, and that she dragged them after her, and suffered much pain in the back, which extended to the head. On the 20th of November she was re-admitted into the hospital: it was found that she had lost all power over the legs, which were affected occasionally with spasmodic twitchings and pain. She continued in this state for a month, when she complained of great pain in the back, and also in the back of the head; her face and head were swollen, and she became quite delirious. Leeches were frequently applied to the back, blisters to the temples, and behind the ears. A pill, composed of colocynth and croton oil, was administered every night, and calomel with antimony twice a day. She remained delirious for three days, and afterwards gradually became sensible. From this time she improved, under the same plan of treatment that had been before adopted, but with a little occasional variation, and was enabled to leave the hospital again on the 10th of January, 1839.

She remained an out-patient for some time, and gradually improved in strength, until she quite recovered. I have seen this patient several times, and she remained perfectly well in November, 1840.

Remarks.

In this case there was evident inflammation of the structure of the vertebræ and surrounding membrane, with pressure upon the spinal marrow; and on her second admission the inflammatory action no doubt had attacked the spine itself, and the brain became affected. In several cases that have come under my observation, similar consequences have resulted, and these are likely to occur in caries of the vertebræ; and it will be seen in the case of Edward Cunningham, that they terminated fatally.

In cases of inflammatory affection of the spinal column and surrounding membrane, the arms alone may be subject to pain and palsy, on account of the membrane covering the bone becoming so thick, that the nerves suffer pressure in their exit between the vertebræ, from the spinal marrow; and of course this takes place when the seat of the affection is at the lower cervical and upper dorsal vertebræ, as the nerves are given off in this situation, to be distributed throughout the superior extremities.

An illustration of this will be seen in the following interesting case.

CASE.

Drusilla Ryland, sixty-two years of age, a widow, from the country, was admitted into the Middlesex Hospital October 8th, 1839, under my care. She stated that four days previous she fell down an area upon her head, and was picked up, as she expressed it, "all of a heap," the head being doubled forwards. She was not insensible when raised, but became so soon afterwards, and remained so for twenty minutes. She felt great pain in the back and head, and afterwards numbness in the arms ensued: she did not make quite so much water as usual. She was attended by a medical man, who bled her, applied a blister to her stomach, and a bag of hot bran across her abdomen. She vomited blood on the Sunday following, but not afterwards. A warm plaster was applied to the back, and a warm aromatic draught taken, as the pulse was low and weak. Her bowels were open, the tongue clean.

October 9th.—She complained of more pain this morning than yesterday, but in other respects remained much the same.

10*th.*—The back was better, but not the head,

which was examined, and a very slight bruise discovered on the anterior part; the pulse had more power, the tongue a little dry. At seven o'clock in the evening she became suddenly insensible, without any previous symptoms; attended with frequent spasms of the arms, which were violently moved, but not of any other part of the body; the eyes were closed, and the pupils very contracted; pulse seventy-two, small and firm. After the fit had lasted a quarter of an hour, it went off, and she became sensible and composed, but complained of pain in the head and back. I ordered calomel and antimony to be taken every six hours.

11*th.*—She was better, but still complained of pains in the back and head: bowels open, pulse low.

12*th.*—Still improving; bowels open, pulse low, tongue clean, pain in the head less, but greater in the back; the calomel and antimony were continued.

13*th.*—Slight pain in the head, but much in the back, which prevented her sleeping. Pulse quick, bowels open, tongue clean: the calomel and antimony continued.

14*th.*—Pain in the back somewhat mitigated,

and the nurse was ordered to rub it with soap-liniment.

15*th.*—She had another fit similar to the last, which continued for half an hour: the arms were again convulsed, but no other part of the body: the eyes were closed. Two blisters were applied, one on each side of the spine, extending the whole length of the injured part, from the fourth cervical to the third or fourth dorsal vertebra.

16*th.*—She complained of pain in the back, extending to the pit of the stomach: pulse quick, tongue clear, bowels open. The blisters were ordered to be dressed with blue-ointment; five grains of blue-pill to be taken night and morning.

17*th.*—Much the same: the bowels not being open, an aperient powder was ordered.

18*th.*—Complained of more pain in the head; back easier, bowels open, tongue clean, pulse low. Eight leeches were applied to the back of the head behind the ears, and the blue-pill was continued, and three grains of calomel to be taken every six hours.

19*th.*—The back was better, but the head more painful; pulse rather quick. A blister was

applied to the nape of the neck, and two grains of calomel and three grains of antimonial powder taken every six hours.

20*th.*—Head a little better, but much the same pain in the back as yesterday.

22*nd.*—Complained of the eyes being very painful; head much the same, bowels well open, tongue clean. Cold lotion was applied to the head.

28*th.*—Continued much the same since the last report, until last night, when the pain in the back and the head returned as violent as before, which deprived her of sleep: two more blisters were applied on each side the spine.

29*th.*—Much the same as yesterday.

November 2*nd.*—Still complained of much pain in the head: eight leeches were applied behind the ears.

3*rd.*—Much the same: the pain in the head a little less, but same pain continued in the back.

4*th.*—She was better, and progressing favourably; tongue clean, pulse low.

5*th.*—The head was much better, but she again complained of pain in the back; pulse very low, tongue clean; a basin of weak beef-tea was ordered for her. The calomel had been continued.

18*th.*—Was still amending, although some pain remained in the back: a warm plaster was ordered to be applied to the seat of pain.

22*nd.*—Much about the same: bowels not very open; a little pain in her back and head. Three grains of hyd. c creta and six grains of rhubarb were taken every night; the calomel and antimony were discontinued.

28*th.*—She continued nearly in the same state, but to-day complained of more pain in the head; a blister was therefore applied to the upper part of the back, and an aperient powder was given to her directly.

29*th.*—Complained of much pain in her head; pulse quicker than yesterday, bowels open, tongue clean: she was ordered to take the calomel and antimony again, but only every night.

December 6*th.*—She had been going on much the same, but this morning complained of more pain in the head: leeches were again applied to the back part of the head behind the ears.

10*th.*—She was a little better, but complained of much pain in the left arm, from the shoulder to the end of her fingers, with considerable numbness in both of them. The arm was ordered to be rubbed with a stimulating liniment.

11*th.*—Much about the same: the pain in the left arm continued, and the numbness had increased a little: a blister was ordered to be applied on the left side of the spinal column.

12*th.*—Much about the same: the blister had not drawn sufficiently, and was therefore kept on until the evening. The pain in the arms and the numbness increased: she also felt it in the right arm, but more so in the left. The head was quite free from pain. There was always in this case great tenderness upon applying the hand down the spine, although there was no apparent bruise, to indicate inflammation in the surrounding membrane of the spinal column.

13*th.*—The pains in the arms were more severe, and she could hardly use the left one: the blister had risen, and the open surface was ordered to be dressed with the blue-ointment. The arms were still rubbed with the stimulating liniment.

14*th.*—The tenderness in the back had somewhat abated, the arms were less painful, and she had more use of them.

15*th.*—The tenderness in the back still decreased; the arms had more power, and were less painful.

16*th.*—The back was much better; the pain in

the arms had completely subsided, and she could move them both freely.

17*th.*—She was so much improved that she was this day discharged, and made an out-patient.

She has been several times to see me since, and has quite recovered the use of the arms, and the pain in the back has completely left her, so that she may now be considered convalescent.

Remarks.

It may be observed in this case, that as the pain in the back increased, the arms gradually lost their power; being at first benumbed, and afterwards almost useless: and that as the pain in the back decreased, the arms were restored to their proper sensibility and power; thus clearly pointing out, that the cause of the pain in the back was inflammatory action in the surrounding membrane of the bones of the spine, and by the membrane being thickened, pressure was occasioned against the nerves as they passed to the arms.

Supposing that inflammatory action should arise in the vertebral column, and the constitution be of a scrofulous habit, or of any other predisposing morbid tendency, such inflammatory action may give rise to other diseases of the spine, namely,

caries, which may cause angular projection,—a softened state of the vertebral column, by absorption of the more solid part of the bone, which may cause lateral curvature,—or a general softening of the bodies of the vertebræ, which may cause a deviation of the spine either backwards or forwards. I need hardly, therefore, point out the great necessity of paying strict attention to the treatment of this affection of the vertebral column.

I wish it to be understood, that inflammatory action, when it attacks the spine, not only affects the ligaments of the spine, but the membrane covering the bones themselves, and also the intervertebral substances; and as these several parts are extremely vascular, they are more predisposed to take up an increased action from any exciting cause; the cancellated structure of the bone also participates in the action thus commenced.

Such inflammatory action is liable to extend to the coverings of the spinal marrow, from their contiguity to the seat of disease, and to cause paralysis and other unfavourable and distressing symptoms, which require immediate and active treatment on the part of the medical practitioner.

Having concluded my observations on inflammation of the cancellated structure of the vertebræ and

the surrounding membranes of the spinal column, and having illustrated this part of my subject by such cases and examples as I trust will enable the reader to comprehend my views, I shall now proceed to discuss the last division of my treatise, namely, injuries of the spine.

INJURIES OF THE SPINE.

Injuries of the spine may be divided into two classes, the first of which affect the spinal marrow, leaving the spinal column uninjured; and the second, injuries of the spinal column, producing pressure on, and even laceration of, the spinal marrow. A fracture of one or more vertebræ may occur, displacement take place, and the pressure cause paralysis of all the parts below it; or the fractured portion of bone may lacerate, or even divide the spinal marrow, producing the same result. For example, a patient may receive a blow on the back or loins, and the spinal column not be seriously hurt; but concussion of the spinal marrow causes a palsy of the parts below the seat of the blow.

As it is my intention at present only to treat of injuries of the spinal column, I must leave the injuries and other affections of the spinal marrow

unnoticed, as it would render this work too voluminous; besides, the subject is of itself full of physiological interest, and will throw much additional light on the nervous system, and therefore will supply ample materials for a separate treatise.

Fractures of the vertebræ happen from violence to the neck, back, or loins, and may take place either with or without a displacement of the fractured portions of the bone. The symptoms, at the same time, may be nearly similar. Palsy of all parts below the injury may result from pressure of the displaced bone, or of extravasation upon the spinal marrow. The former is of more consequence than the latter, if the pressure be allowed to remain: whilst the extravasation may become gradually absorbed, and restore the lost power to the paralysed parts. A fracture may occur of the body of one or more bones of the spine, of the arches of the vertebræ, or of other parts of the bone. These accidents were formerly considered as dislocations of the spine; but a displacement of one bone from the articulating surfaces of another seldom occurs, except in the cervical vertebræ. In post-mortem examinations of several men who have suffered death under the sentence of the law, I have invariably discovered a dislocation between

the atlas and dentata, so that these men must have died almost immediately, for the pressure would have caused a palsy of all the parts below, and instant dissolution must have been the consequence. Should injuries occur above the origin of the phrenic nerve, that is, above the third and fourth cervical vertebræ, so as to occasion pressure upon the spinal marrow, the same result would necessarily follow. It will therefore be apparent, that, as pressure upon the spinal marrow occasions palsy of all the nerves below it, the higher in the spine the injury takes place, the greater will be the danger; whereas, if the injury be low down, less of the body will be paralysed. Yet it must be recollected, that inflammation in either case may take place in the spinal marrow, and may very soon extend to the brain, and end fatally.

Sometimes the arches of one or more of the vertebræ may be fractured, and the bone depressed, so as to cause pressure on the spinal marrow; and as these accidents have proved fatal, the late Mr. Cline, and afterwards Mr. Tyrrell, treated them in the same way as a fracture of the cranium, by removing the depressed portion of bone: and although the cases terminated unfavourably, this appears the most just and reasonable plan of treat-

ment, as it affords the patient the best chance of recovery. If the spinal marrow should be lacerated, the operation could not be of the same advantage as when it is uninjured. At all events, it possesses one great advantage, it may relieve the patient, but cannot place him in a worse state; whereas, if the bone remains depressed, there can be no hope of recovery.

In the treatment of fractures of the vertebræ, the usual plan has been to place the patient on a bed, to keep him perfectly quiet, and to use every means to keep the spine free from action. In the treatment of fractures of the bones of the extremities and other parts of the body, it is agreed by all surgeons that extension is absolutely necessary to reduce the fracture, or to set the ends of fractured bones in apposition to each other; but when a fracture has occurred in the spine, no attempt is made to restore the bones to their proper places. I cannot see why extension in a moderate degree, kept up for some time, and then increased, should not prove beneficial, by restoring the fractured portion of bone to its proper situation. It must always be desirable that the surgeon should endeavour to relieve his

patient; but if the depressed bone remains, there can be no chance of preserving life. Extension judiciously employed, is not likely to increase the danger; and as it may be of service in this, as well as in other cases of fracture, the surgeon will surely exercise a sound discretion in applying it.

Old authors treated dislocations of the spine, as they have been called, in the following manner. The patient was placed over a barrel, one man pulling at his head, and another at his feet, the sufferer being placed either on his back across the barrel, or on the abdomen, according to the nature of the accident. Ancient surgery then, although rude in its treatment, attempted means to restore the fractured bones to their proper places. Modern surgery, with all the improvements which have poured in upon it from innumerable quarters, has left this accident to take its chance, without lending a helping hand to assist nature in remedying the injury.

In some accidents of the spinal column, although the violence encountered is not sufficient to fracture the vertebræ, it will bruise them, in which case inflammation follows, and which, if allowed to

take its course unrestrained, may become chronic: and under the most judicious treatment, this will sometimes terminate in a disease of the bone. In all cases, therefore, of this nature, our first attention must be directed to prevent any inflammatory action from establishing itself; or if already in progress, to arrest and cause it to subside. It would be difficult to fix any precise period in which a cure may be anticipated; it varies very considerably in different constitutions. If the body is in a perfectly healthy state, free from any predisposition to disease, a very short time would accomplish it; whereas, in a constitution with a morbid predisposing cause, the time may vary very considerably, from months even to a year or two. But let the period be either of a short or a long duration, it is absolutely necessary that the patient should constantly keep the recumbent position, or that the spine should be freed from its own weight, otherwise it will quickly become diseased. The origin of many cases of caries of the vertebræ may be traced to external violence; for, so little attention is paid, or no continued treatment follows the accident, that the disease is allowed gradually to make its destructive progress unchecked into the adjoining healthy bones. I have seen several cases in which

the disease might have been arrested, if proper means had been resorted to immediately after the accident.

When pressure against the spinal chord results from an injury of the spine, not only paralysis of the muscles takes place, with the loss of sensation, but the bladder becomes inactive, and cannot discharge its functions, and the rectum loses its muscular powers of contraction, so that the patient passes its contents unconsciously.

I cannot conclude this important subject better, than by directing the attention of medical men generally to a minute investigation of it whenever an opportunity occurs. The variety of forms under which it appears—the great dissimilarity that presents itself in almost every case—and the obstacles that we have always to overcome, render any information founded on practical observation of the greatest utility. For the furtherance of pathological inquiry, I have added a few interesting cases on this subject.

CASE.

Fracture of the body of one Dorsal Vertebra, with complete Paralysis of the part below the Fractured Bone—Dislocation of the Shoulder-Joint—and Fracture of the Fibula, with Dislocation of the Tibia inwards.

James Neald was admitted into the hospital November 5, 1833. It appeared that he was at work in a sewer, when the earth fell in upon him: he was extricated from his perilous situation, and brought to the hospital. When examined, it was found that the spine was injured, and it was supposed that one of the bones was fractured; the shoulder-joint was dislocated, the head of the humerus being under the pectoral muscle. I reduced the head of the bone, and had the arm bound to the side: the patient had lost the use of the lower half of his body. The leg was broken, the fibula being fractured, and the foot dislocated outwards; it was reduced, and placed in junks; catheterism was performed night and morning, and the patient placed in bed. He did not suffer much pain, but lingered for nineteen days, when

he died. On examining the body, it was found that the eleventh dorsal vertebra was fractured obliquely, through the body of the bone; that the fractured portion pressed against the spinal marrow, causing the paralysis of all the parts below the injury. The fibula was fractured about two inches above the outer ankle: the fractured bone could be easily displaced, and there did not appear to have been the slightest reaction in these parts to produce any degree of union. A careful examination of the shoulder showed that the capsular ligaments had completely reunited, and a person could have scarcely believed that any dislocation had taken place, who had not seen the patient before it was reduced.

The preparation of the fracture is in my collection at the Museum of the Hospital, and clearly points out the situation of the broken portions of the dorsal vertebra.

Remarks.

This case will serve us to demonstrate some very curious and important physiological phenomena, arising from the paralysis of the body downwards, from the armpits. We find that the fracture of the fibula—the leg being paralysed—did not re-

unite, nor did there appear any reaction about the parts to effect it; whilst the capsular ligament of the shoulder-joint, which was not paralysed, did unite, and was scarcely perceptible. The influence and absolute necessity of nervous energy for the reunion of fractured parts therefore becomes a matter of certainty; and this will lead us to another question of no less importance, which will be to determine whether this inaction is to be ascribed to the secreting vessels not performing their proper functions, or to the inert condition of the periosteum of the bone. My limits will not allow me to discuss the subject, but I conceived it to be too interesting to pass unnoticed.

CASE.

Injury of the Spine—Fracture of the Vertebræ—Palsy of all Parts of the Body below the Injury.

Thomas Edwards, twenty-eight years of age, was admitted into the hospital on the 21st of May, 1838, having fallen into a well while he was superintending the works. He struck in falling against some of the large beams across the well,

the upper of which was six feet from the surface. He was immediately pulled up, when it was found that he was attacked with paralysis, from just below the armpits downwards. He was quite sensible, but did not know where he was hurt. He was placed in bed, and when examined, there appeared a slight bruise over the situation of the last cervical vertebra, and great tenderness upon pressure over the two or three upper dorsal: all the anterior part of the body was quite numb and motionless: he had no injury of the head, but was unable to raise it slightly forward. He experienced a tingling sensation along the under side of the arms, and in about an hour after his admission he felt a similar sensation in the soles of his feet. Twenty leeches were applied to the neck, as the seat of the injury, and he was ordered to take ten grains of calomel. The bladder being also quite paralysed, it was necessary to have recourse to catheterism. The next morning he remained somewhat in the same state.

23*rd*.—He was somewhat better: he felt a tingling sensation round his loins, with a starting pain, which came on occasionally and prevented his sleeping: he was ordered to be cupped to the extent of twelve ounces. Calomel and antimony

were prescribed, and he was placed on the water-bed to prevent his back becoming sore.

On the 24th he was better: felt some relief from the cupping. The tingling sensation now extended from the armpits down the back part of his thighs and legs, and remained the same across his loins. In the arms it amounted to actual pain when the slightest motion was made. He complained that he had great difficulty in expectorating the phlegm that collected in his throat: he had no difficulty in swallowing. He was ordered some linctus to be taken occasionally.

25*th*.—He was much worse; his breathing became so rapid, that it almost prevented his speaking: pulse one hundred and forty. Complained of a bad taste in the mouth; oppression in the throat a little better, tongue dry and foul, countenance much altered, pain in the arms and the other sensations much the same. He was ordered to be cupped again to twelve ounces, and the pill, with calomel and antimony, to be continued; also the effervescing saline draught every six hours. In the evening he was much the same; the pulse was very shabby; his mouth was very dry: he was placed on his side at his request, and the saline draught was ordered to be given more frequently.

26*th*.—Breathing slower, pulse not so rapid, countenance very anxious. He fancied he was better, and felt very eager for food: he was allowed some, but while eating he expired suddenly, at five o'clock in the evening.

When the body was examined, an aperture was discovered between the seventh cervical and first dorsal vertebra, constituting a dislocation of the two bones. The intervertebral substance was separated from the bone, and a portion of the spinal column displaced. The transverse processes of the first dorsal vertebra were broken, the greatest fracture being on the right side. The spinal canal being opened, an effusion of blood was found lying on the inner side of the dura mater; the spinal marrow was ecchymosed opposite the dislocation, and all the ligaments uniting the two vertebræ were lacerated. The dura mater and spinal marrow were entire, nor was there any injury of the nerves. The trachea was inflamed, but no other lesion existed.

Remarks.

The pains the patient experienced under the arms resulted from the undue pressure on the nerves that supply the axilla, which arise from the last cer-

vical and first dorsal. The extravasation of blood within the dura mater would have been quite sufficient to cause the palsy, even had no dislocation taken place. His sudden death, however, might have been caused by the exertion of eating, the action of deglutition, or the pressure of the food affecting the injured part of the spine, and producing a shock on the nervous system.

CASE.

Fracture of the Spine.

Arthur Denham, upwards of eighty years of age, was admitted into the Hospital on the 13th of August, 1838, having fallen from a break about nine feet high. In the fall, his head and neck were struck behind. When brought to the hospital, he was perfectly paralysed from the chest downwards, with both the loss of motion and sensation. There was a superficial graze on the back part of the head, and about the middle of the neck a slight prominence, that was very tender when pressed. He complained of cramps in his hands and arms. Leeches were applied to the neck, and a few hours after his admission, sensation had partially returned in the legs, which he could raise a little. The next

morning there was paralysis of the bladder, which required catheterism to be performed twice a day. He had no headache, but complained principally of the pain in his back, and cramps and tingling in his arms. He continued much about the same till the 17th: the right side was then more paralysed than the left; he could draw up his left leg to the abdomen, and grasp things firmly with his left hand, but could do neither with his right extremities. The pain in the back of his neck was less: paralysis of the bladder unabated.

On the 19th two gangrenous spots were discovered on the back, and he was therefore ordered to be placed on the water-bed. From this time to the 31st he remained much in the same state: the sores in the back had now got better; he could move his hands freely, and had more power over the legs, but he was getting very weak.

This old man gradually declined, not being expected to live from one day to another: he died from perfect exhaustion on the 13th of September. The paralysis of the bladder continued until within two days prior to his death, when incontinence of urine established itself. On examining the body, it was found that the seventh cervical vertebra was fractured, and partially displaced.

Remarks.

In this case the paralysis, in a great measure, subsided in the legs and arms, although the fracture remained just in the same state as when the accident occurred. Considering the great age of this patient, it is surprising that he lived so long.

CASE.

Injury of the Spine, followed by Palsy of the Legs.

Henry Lenney, twenty-five years of age, was admitted into the Hospital, February 2, 1836. He stated, that while carrying a sack of flour, he made a false step, and finding he could not keep the sack on his back, he threw it down; he then found he could hardly walk, and was obliged to lay down on a board for some time: he, however, was able to follow his work as usual for about nine days. He had been accustomed to carry heavy sacks of flour, and to raise them upon shelves higher than himself. He found that he now became giddy, his legs were very weak, and he could not work. He consulted a medical man, who ordered him an aperient draught. Having occasion to get out of bed in the night, he found he was not able to get in again,

having lost the use of his legs. When he was examined on his admission into the hospital, it was found that the eleventh dorsal vertebra was depressed, its spinous process being much below the others, while the vertebræ above and below it were raised and projected: the legs were quite motionless, with paralysis of the bladder. He was cupped, and eighteen ounces of blood taken away; an aperient was given; catheterism was performed night and morning. A few days after twenty leeches were applied to the back, and it was considered necessary to have him cupped again. Four small issues were applied round the depressed portion of bone, which were kept open, and a mild dose of mercury prescribed. Shortly after this he could move his legs, and in three weeks he was able to walk round the bed, by leaning upon it occasionally. The palsy of the bladder was succeeded by incontinence of urine, which was of a very high colour. It partially subsided; and in a short time he was able to walk about the ward, but was prevented from doing so. He felt a stiffness of the legs, and a twitching or contraction in them, particularly at night, which, however, gradually subsided, and the incontinence of urine was relieved. He was soon enabled to walk with ease,

but taking too great exertion, he had a relapse: the same treatment was followed, and after remaining in the hospital for six months, he was discharged quite cured, on the 2nd of August, 1836.

Remarks.

This case points out that the spine may receive an injury, and the consequence continue for some time, notwithstanding the treatment employed was directed to counteract it. It shows that in these cases the urine is of a high colour, which depends no doubt upon the pressure of the nerves of the kidneys that pass to supply them, so that the primary cause of the symptoms should be promptly attended to. The paralysis of the legs was the effect of chronic inflammation, either of the sheath of the spinal column opposite the seat of the injury, or of the structure of the bone itself; and I am of opinion, that had the patient been allowed to remain in bed without any surgical treatment, disease of the bodies of the vertebræ would have been the result; when angular projection of the spine must naturally have followed. This case therefore points out the advantage of judicious treatment in these injuries, as well as in other affections of the spine.

CASE

Injury of the Spine—Tumour in the Back—Cure.

John Armstrong, thirty-five years of age, was admitted into the Hospital the 29th of June, 1838, having fallen out of a two-pair-of-stairs window. A cut was visible on the forehead, allowing the free introduction of the finger, when the bone was found to be bare to the size of a shilling. There was no fracture. He complained of great pain across his loins, placing his hands constantly on the lower part of his spine. On examining it, a large soft tumour was discovered at the lower part of the dorsal vertebræ, and on tracing the spinous processes downwards, it was discovered that one of them was missing, about the twelfth dorsal. He felt more pain at the lower part of the spinal column; he could move his legs, and had sensation in them. His pulse was small and weak, countenance expressive of severe sufferings, the pupils were rather dilated; skin was quite insensible to the touch. The following day he was much about the same; had no power of passing his water: he was ordered a drop of croton oil, and in

the evening his bowels were open, and he was able to pass his water without assistance, and he felt more comfortable. At eleven o'clock he was again visited; his pulse was then quick, the skin hot, his tongue white: he was ordered two grains of calomel, and three of pulv. antimonialis, to be taken every six hours. He continued to improve, but as his back began to feel very sore from lying on it, he was ordered to be placed on the water-bed.

By the 4th of July he had improved under the treatment: he felt occasionally as if his legs were gone to sleep: he had no loss of power in them.

On the 6th he complained of numbness and pricking pain over the whole of his body, and had some difficulty in passing his water.

The 10th, he could move his limbs, but complained of much numbness; and screamed when any part of his body was moved.

14*th.*—Very little alteration had taken place: he felt less pain in the back, looked better, the wound in the head had completely healed: he asked for more diet, and was allowed some fish.

19*th.*—He was somewhat better, appetite returned: there was a hollow place in the back where the tumour existed, which had gradually dispersed, leaving a space. When he put his hand there and

pressed against something, his legs began to tremble; then paralysis followed, and he afterwards became insensible. He had done this two or three times, when I particularly requested him not to do so again, as it was attended with much danger. He was kept on the water-bed on account of the disposition of the back to become sore, and carefully watched. He gradually improved, and in the early part of September was so much recovered, that he was enabled to leave the hospital, but did so contrary to my wish and advice.

In the October following he came to the hospital; he was much better, and able to walk a little, but there was some degree of deformity of the back, as it projected above the place where the depression previously existed.

November 17.—I hear that he is better, and able to walk about his own house occasionally; but it would appear that he had not complete power over his limbs. Since this report, I have not heard of the case.

Remarks.

The tumour on this man's back presents some interesting observations, arising from the paralysis that followed any pressure on the place, after it had

subsided. From this circumstance, and the nature of the tumour, with the abscess of one of the spinous processes, I am inclined to think that the spine must have been injured, and that chronic inflammation established itself in the cancellated structure of the bodies of the vertebræ, which must have been pulled forward by the flexor muscles.

OPERATION FOR THE CURE OF SPINAL AFFECTIONS.

Of late years a practice has been introduced in operative surgery, which promises to be of the greatest utility in remedying many cases that have hitherto baffled the attempts of science in effecting a cure. I allude to the division of certain muscles or their tendons, which from their contracted condition exercise an undue influence, and occasion deformity. Thus the contraction of the sterno-mastoideus, or adjacent muscles, produces wry-neck, and of the rectus internus of the eye, squinting. In a similar way a deficiency of the os calcis may produce club-foot.

The discovery of the principle on which these operations are based, is not of so modern a date as we might be led to suppose, from the few instances in which (till within a year or two) it has been applied. Mr. Cooper in his Dictionary informs us, that the division of the muscles for wry-

neck was performed by Minius, a celebrated surgeon who flourished in the middle of the seventeenth century. M. Geurin was the first, I believe, who divided the tendo Achillis for club-foot; and we are indebted to Herr Dieffenbach for introducing the now popular operation of dividing the rectus internus for the cure of strabismus.

The success attendant on these operations naturally led scientific men to investigate the condition of other more complicated and extensive deformities; and the result of their inquiries has led to its adoption in certain cases of lateral curvature of the spine. I am not aware who first performed this operation, but M. Geurin of Paris, Dr. Hunter of Glasgow, and Messrs. Skey and Child of London have undertaken it with various results; and the immense importance of the subject induces me to devote a chapter to it, as the conclusion of the present work.

The almost universal success that has attended the operation for strabismus, will, I fear, be productive of much mischief, by inducing a want of caution and circumspection, and will mislead the practitioner as to the propriety of operating in more complicated cases of deformity. They must, however, bear in mind, that in these cases there is only

one muscle to divide, which is easily exposed and detached; whereas in lateral curvature, independently of the other numerous considerations that must be weighed before we attempt on an operation, we must also consider the different muscles that aid in producing the deformity, and maturely reflect which of them, by being divided, will effect a cure.

At a time when an operation like the one under consideration is in its infancy, it becomes an arduous, if not a fruitless task, to lay down any fixed rules for the guidance of the practitioner, in the selection of those cases that may be operated on with any reasonable anticipation of success, for practical results should, and must alone guide scientific men in their opinions. I shall, however, state some general rules, which I have no doubt will be found by experience to be correct.

One fixed rule, however, I may venture to lay down, which is, that the operation must be confined to cases of simple lateral curvature, where the disease is entirely owing to the undue action of muscles, and where the spinal column is not the seat of disease; for it must appear evident, that where the bones of the spine are diseased in any way, the simple division of a set of muscles would

only give an ascendant power to their opponents, and produce deformity in another direction. Again, it is not all cases indiscriminately of simple lateral curvature that may be selected as fit subjects for operation; a healthy diathesis is an essential and indispensable requisite; for if there is any constitutional disease, such as scrofula, &c., the use of the knife may be productive of the very worst consequences.

Having explained which cases must be rejected, and those that after attentive consideration may be accepted, I shall proceed to examine how the operation can be performed with the greatest advantages, and least risk.

It will be a matter of urgent consideration before the operation is performed, for the practitioner to clearly ascertain which are the muscles that cause the deformity. This will, I apprehend, be the greatest difficulty he will have to overcome: for unless the action, relation, situation, origin, and insertion of all the muscles of the back are fully remembered, the operator cannot hope for success. The muscles of the back consist of several layers, and are not so easily got at as others that lie more superficially; their proximity also to the cavities of the chest and abdomen, renders the chance of

any inflammatory action in their vicinity of serious importance. Before, therefore, the knife is taken in hand, let him satisfy himself fully as to what he has to do; let nothing be left to chance or afterthought.

In operating, two points must be carefully kept in view, the first, not to make the opening in the skin larger than is absolutely necessary; the second, to be careful that the muscle or muscles to be divided be completely separated, otherwise, if any of their fibres remain uncut, they may render the operation abortive.

The surest and most efficient plan that I have been able to devise for the division of muscles, and which I have invariably practised satisfactorily, I should be inclined to recommend in the present instance. It is as follows. Having ascertained what muscle is to be cut, a small opening is to be made in the skin, at the side of the muscle, sufficiently large to admit a director, which is to be passed in, and carried underneath the muscle, until it is felt on the other side, and then held there by an assistant. A blunt-pointed bistoury is then to be introduced, and passed along the groove of the director, till its blunt point is felt at the other end by the operator. The director is now

to be withdrawn, and the operator, keeping his finger on the point of the bistoury, is to depress the handle, and gradually withdraw it, taking care as he approaches the opening not to enlarge it more than can be helped. By this means all the fibres of the muscle must necessarily be completely divided.

The bistoury must vary in size according to the dimensions of the muscle to be divided: for general purposes, one rather smaller than that used to divide the stricture in hernia will be large enough; but for larger muscles, as the trapezius, and rhomboidei, it should be about five inches long, the blunt point being the eighth of an inch, and the cutting blade about an inch in length.

The advantages of this method of operating, compared with the use of the knife, must appear evident. It insures a perfect division of the muscle required to be separated, without the possibility of wounding those apposed to it, while at the same time the opening is so small that no ill effects may be anticipated from the external wound.

In conclusion, I shall insert an abstract of two cases that have appeared in the Medical Gazette, the only two, I believe, that have (7th December, 1840,)

been published, without, however, quite concurring in the plan pursued. But I think it advisable that any practical experience should be made generally known.

The first case is related by Mr. Child as follows:

"The subject of operation was a lad, seventeen "years of age, who had been affected with lateral "curvature of the spine three years. His business "was that of a printer, in which occupation he "was daily employed in pulling the press, whereby "he was in the habit of putting into excessive ac- "tion the latissimus dorsi and rhomboid muscles of "the right side, whilst those on the opposite were "comparatively inactive: the consequence of this "was, that in six months after his apprenticeship to "the business he began to feel an uneasiness, and, "as he describes it, a burning sensation in the "upper and right side of the back; this was "shortly after followed by an enlargement of the "right shoulder, and a lateral curvature in the "dorsal region. This continued to increase, so "that when he applied to me, about eight months "since, the deformity was very striking. On exa- "mining the back, I found the deviation to extend "from the last cervical to about the sixth dorsal "vertebra: below this the vertebræ suffered no

" displacement, but occupied precisely the mesial " line of the back,—a circumstance most unusual " in a case of so long standing. The right shoulder " was considerably elevated above its fellow, with a " corresponding displacement of the clavicle, but " there was no excurvation of the ribs: on either " side they retained their natural situations.

" The rhomboid and trapezius muscles were " greatly enlarged, and by bringing the forearm " across the chest were so stretched that a finger " could easily be passed beneath the rhomboideus " minor. The muscles on the left side were so di- " minished in bulk that they could scarcely be " traced,—a circumstance I hold of great import- " ance in the operation.

" His general health had been good, with the " exception of suffering occasionally from enlarged " cervical glands. As his means would not allow " him to adopt my regular course of treatment for " these affections, I recommended him to keep as " much as possible in the prone position, to use my " extension apparatus, and to employ certain forms " of exercise.

" In consequence of the nature of his employ- " ment he was prevented from pursuing this course " with the regularity wished, and the right arm

" was daily occupied in pulling the printing-press.
" I lost sight of him until last week, when he again
" applied to me, and not finding the slightest im-
" provement in the state of his back, I explained
" to him the nature of an operation which had been
" performed by M. Guerin, in Paris, and lately by
" Dr. Hunter, of Glasgow, and recommended him
" to undergo it, as the only probable means of effect-
" ing a cure ; and without hesitation he assented.

" The patient being placed in the prone position,
" with the chest considerably elevated, and the
" head hanging over the table, Mr. Coulson pro-
" duced tension of the muscles on the concave side
" of the curve by drawing the left arm forwards,
" whilst Mr. White, by raising the right shoulder
" upwards and outwards, kept the rhomboid and
" trapezius on the stretch. I then introduced my
" knife (which was about four inches in length, and
" the eighth of an inch in breadth, as close to the
" ribs as possible, midway between the inferior
" angle of the scapula and the spinal column, and
" carried it upwards as far as its superior angle: I
" then withdrew the knife, bringing its cutting edge
" in contact with the anterior surface of the
" muscles, and as close as possible to the integu-
" ments, without wounding them, and in this way

" completed the operation, which occupied less than " a minute. The loss of blood was trifling, and " the patient complained of very little pain."—*Medical Gazette*, 27th November, 1840.

The second case is by Mr. Whitehead, of Manchester :

" Mr. W. P. J., a young gentleman twenty years " and eight months old, son of Major J. of the " —th regiment, was placed under my treatment " in February last, for a deformity of the back. I " suggested to him a few weeks ago the operation " of division of some of the muscles of the back " as likely to afford some relief, by partially or " totally destroying for a time the action of those " muscles which maintain the spine in its present " position. He consented with great willingness to " have the operation performed, and hoped it " might be proceeded with as soon as possible.

" The deformity consists in a simple lateral curve " to the right side, of considerable extent, and in- " volving more than half the spinal column, com- " mencing at the sixth cervical, and terminating at " the second lumbar vertebra. A cord extended " between these two points would complete it into " a segment of at least two-fifths of a circle. It is " not, however, quite regular in its form from

" beginning to end, the curve being more decidedly
" expressed above than below. The back of the
" chest on the left side is much flattened, the ribs
" being nearly horizontal in direction, and their
" angles scarcely perceptible; while, on the oppo-
" site side, the angles are prominent, and each rib
" so rotated upon its attachment at the side of the
" spine as to bring its body into a very oblique di-
" rection—almost approaching to the vertical, at its
" back part. The angles of the ribs appear to be
" somewhat more bent than natural; but this is
" not so certain. The whole together, and the
" scapula, which is raised above its natural position,
" form a very considerable protuberance; and this
" is increased in appearance by the neck being
" bent forwards and to the opposite side. The
" sulcus for the lodgment of the dorsal muscles is
" obliterated on the right side, and the muscles
" themselves so attenuated as to be almost imper-
" ceptible; while those on the left are full and
" firm, and more than ordinarily developed. The
" muscular system in general is strong and well
" expressed. The deviation from its normal shape
" of the other parts of the chest corresponds in a
" measure with those already alluded to. The
" right side in front projects, and is a little ele-

" vated; the left is depressed, and the sternum ap-
" proaches to a parallel direction with the dorsal
" spine.

" The disease was first noticed in a slight degree
" about eight years ago, but did not create any
" particular alarm among his friends for three or
" four years after its commencement, as he was all
" this time in delicate health, the restoration of
" which it was thought would entirely rectify the
" deformity. It was observed to make more rapid
" progress during the three following years of close
" application to study at College; and his present
" sedentary employment in the study of the law
" has been rather favourable than otherwise to its
" increase. Another circumstance ought to be
" mentioned as having in all probability contri-
" buted—perhaps may have originally determined
" the direction of the curvature, namely, regular
" sword exercise, which formed a part of his early
" education, as he was then intended for the army.
" This, of course, was suspended as soon as the evil
" was discovered. He has been under medical and
" surgical treatment ever since the manifestation of
" the above-noticed symptoms, having consulted
" several eminent practitioners both in London and
" elsewhere. In the early stage of the disease he

" suffered much from pain in the head, for which " he was repeatedly leeched and blistered.

" The objects which I had in view by the opera- " tion were to release the concavity of the curved " part of the spine from the action of some of those " very powerful muscles already alluded to, namely, " the sacro-costalis (sacro-lumbalis) and longissimus " and spinalis dorsi; and by this means to take off " the most powerful resistance to the action of " others which may be brought into play directly " upon the diseased part: as the trapezius and " rhomboidei of the same side; and also to enable " one to operate by artificial contrivance with better " effect.

" The operation was performed in the presence " of Dr. Pendlebury, one of the physicians, and " Mr. Fawdington, one of the surgeons to the " Royal Infirmary, and three other medical gentle- " men. The patient was seated in the reversed " posture on a low-backed chair, the body bent " forwards, and the arms and head leaned over " the back of the chair. A portion of skin oppo- " site the seventh or eighth dorsal vertebra was " pinched up and divided, and the shining fascia " at once brought into view. A straight sharp- " pointed bistoury was then passed between the

" skin and fascia as far as the spine, and the mass " of muscle divided by depressing the instrument " slowly and carefully, and at the same time with- " drawing it. The bistoury was then again intro- " duced through the same opening in the skin, and " passed outwards on the surface of the corre- " sponding rib, so as to divide the attachment of " the sacro-costalis as well as the other slips of it " going to the ribs above. The muscular fibres " separated with a distinct snap, audible to every " one present. Mr. Fawdington's expression was, " that the sound set his teeth on edge. It was like " the separation of a tight bow-string composed of " a fascicle of strong threads. Another small in- " cision was made opposite the third vertebra of " the same region, and the muscles coming down " from the neck divided in the same manner. No " outward incision was made at this part. The " external openings were closed by slips of plaster, " and a compress of lint applied and secured by a " bandage. The patient then got up and walked " to bed with facility. He was placed on his back " upon a hard mattress formed into an inclined " plane. There was considerable difficulty of breath- " ing experienced immediately after the operation, " arising, as was afterwards ascertained, from spasm

" of the posterior intercostal and dorsal muscles of " the right side. This was relieved by a powerful " anodyne draught, and he continued tranquil and " easy two or three hours. I was not able to see " him again until seven hours after the operation, " when I found the difficulty of breathing very " urgent, and was told it had been so for three or " four hours. On placing my hand on the back " part of the chest, near the spine, on the convex " side of the curve, the intercostal muscles were " pointed out by the patient as being the principal " seat of the pain he complained of, and the " erectores spinæ of the same side were more tense " than I had before felt them. The latter, he told " me, had been affected by cramp, which had " several times been very severe, ever since the " operation, and also with a constant quivering " motion, which could be very distinctly felt by the " hand when placed upon the part. A grain of " opium was ordered to be taken immediately, and " to be repeated every three hours if needful. He " passed a very comfortable night, and on the fol- " lowing morning the spasms returned in the same " manner, and continued all day; but not so " severely as before. A grain of opium was pre- " scribed, to be taken at bed-time. On the third

" day, as the patient was quite comfortable, and " felt no pain in the parts, even when he raised " himself into the sitting posture, which he could " do with perfect ease, a little gentle traction was " exercised on the spine, which showed that the " column was certainly flexible, and promised fair " for at least a partial, if not a complete restora- " tion. This was done by fixing the pelvis and " upper part of the chest by bandages, towards the " side of the convexity, and bringing the rhom- " boidei to act on the hollow of the curvature, the " patient lying in the prone position. The same " effect was produced by a person being seated on " a chair, level with the bed, and pulling at the left " arm, having at the same time one foot fixed " against the side of the pelvis, and the other in " the axilla. During the last two days friction " with salt and water and the hair glove has been " practised over the dorsal muscles of the right " side, which continue to act in the manner before " mentioned, and increase in size. The patient's " health has not suffered in the slightest degree."— *Medical Gazette*, 4th December, 1840.

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